2012-2014 Graduate Bulletin

North Dakota State University

The Graduate School

Disclaimer

The purpose of this bulletin is to provide information about the graduate programs of North Dakota State University. It should not be considered an offer or a contract. While every effort has been made to make this information as complete and accurate as possible, it should be noted that changes may occur at any time in the requirements, course offerings, fees, etc. listed in this bulletin. Up-to-date information can be found on individual program pages. However, students are allowed to meet the degree requirements in effect at the time of first enrollment as a degree-seeking student, provided the student is able to complete the degree requirements reflected in the appropriate bulletin within the stated time frame and the student has maintained continuous enrollment status.

It is the responsibility of the student to be familiar with and complete the requirements for the degree being sought.

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 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.

Equal Opportunity Statement

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 and including appropriate affirmative action efforts, for all individuals without regard to age. color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, race, religion, sex, sexual orientation, status as a U.S. veteran, 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. Direct inquiries to the Vice President for Equity, Diversity and Global Outreach, 205 Old Main, (701)231-7708.

Administration of Graduate Studies

Accreditation

North Dakota State University 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. (tel. 1-800-621-7440). In addition, many programs are accredited or approved by their respective professional organizations and agencies.

North Dakota State University is accredited at the doctoral level by the Commission on Colleges and Universities of the North Central Association of Colleges and Secondary Schools.

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 nine-member State Board of Higher Education is the policy-setting body for the North Dakota University System and consists of seven citizen members who serve four-year terms and who are appointed by the governor, one student who is also appointed by the governor for a one-year term, and one faculty member who is selected by the Council of College Faculties.

Privacy of Records

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.

University policies relative to student records are specified in the FERPA annual notice, the "NDSU Policy Manual" Section 600, and at www.ndsu.edu/fileadmin/policy/600.pdf, and contained in the publication titled "Rights & Responsibilities of Community: A Code of Student Behavior," which may be obtained from the Office of Student Affairs, 100 Old Main. Students may restrict the release of directory information no later than the tenth class day of the semester at Registration and Records, 110 Ceres.

NDSU in Perspective

A Bit of History

On March 8, 1890, the state's first governor, John Miller, signed the bill designating the land to establish a college of agriculture and mechanic arts, the North Dakota Agricultural College, as a part of the Morrill Act of 1862. In 1960, the name was changed to North Dakota State University.

The Graduate School

Graduate students were first accepted in 1895, and a formal announcement of graduate studies has been carried in the bulletins since 1902.

The Graduate School was formalized July 1, 1954, by approval of the North Dakota Board of Higher Education. Graduate studies were administered by a Graduate Council from November 1949 to June 1954, and before that by a Graduate Committee.

The first Master of Science degree was awarded in 1899. Since then, graduate students have been in regular attendance and have participated in the scholarly activity of the campus. The number of degrees awarded increased noticeably after 1920 and again after 1950 in reflection of general trends in higher education in the United States.

In 1959, the North Dakota Board of Higher Education first authorized certain departments to offer the Doctor of Philosophy degree. The first Ph.D. degrees were awarded in 1963.

NDSU Today

North Dakota State University is the state's first Morrill Act land-grant institution. Located on the state's eastern border in Fargo, North Dakota's largest city, the university strives to be a leader in information systems, technology transfer, economic development, and lifelong learning; and encompasses a broad

spectrum of curricular offerings, scholarly activity, and service. It is one of two major research universities in an eleven-institution state university system.

NDSU has enjoyed steady enrollment growth for the past decade. Current enrollment is over 14,000 students on the campus in Fargo. Over 2,100 are graduate students. NDSU also serves several thousand people throughout the state in continuing education and extension programs.

Instruction is carried out in nine academic units: the Colleges of Agriculture, Food Systems, and Natural Resources; Arts, Humanities, and Social Sciences; Business ; Engineering and Architecture; Human Development and Education; Pharmacy, Nursing and Allied Sciences; Science and Mathematics; University Studies; and the Graduate School.

NDSU has 46 doctoral and professional programs, 66 master's degree programs, 9 certificate programs and 102 bachelor's degree programs. The North Dakota Agricultural Experiment Station and NDSU Extension Service are integral parts of the University.

NDSU participates in the Tri-College University consortium with neighboring Minnesota State University Moorhead and Concordia College. NDSU has approximately 1,500 staff members and 950 faculty and academic staff.

The Fargo-Moorhead Community

Named one of the most desirable places in the country to live by Money magazine, Fargo is quietly earning a reputation as a perfect place to make a home. Nestled in the rich farmlands of the Red River Valley, the Fargo-Moorhead community has many qualities that contribute to this reputation, including a highly respected educational system; advanced medical technology; a progressive business community; numerous cultural and arts opportunities; clean air and water; and good-hearted, friendly people. With more than 163,000 people in the community and about 500,000 people in the service area, Fargo-Moorhead is among the largest metropolitan centers between Minneapolis and Seattle. One of the reasons people choose NDSU as a place to get a good education is that the F-M community provides students access to part-time jobs, internships, parks and other recreational facilities, entertainment, and cultural amenities.

Tri-College University

Tri-College University is a consortium of the three Fargo-Moorhead institutions of higher education: North Dakota State University, Concordia College, and Minnesota State University Moorhead. Through the Tri-College course exchange, students can take courses on the other two campuses without going through separate admissions procedures. Tuition is paid only to the home school. Guidelines are available in the general NDSU Bulletin and from the registrar.

Bus service is provided among the campuses daily during the academic year.

Reciprocal parking arrangements are available for students who wish to drive to the other schools. Students may use the library resources of all three schools. This highly effective sharing of library resources is facilitated by a combined serials listing and twice-daily delivery service.

Several academic programs are conducted jointly by the three schools. Master of Science, Master of Education, and Educational Specialist degrees in Educational Leadership are offered through the Tri-College University. The scope of opportunities for students is expanded by the sharing and coordination of programs and services among the many academic departments within the three schools.

Continuing Education

Continuing Education is an outreach unit of the university that makes the resources of the institution

available in a variety of ways, including distance-based education. Courses, locations, and delivery systems are planned in response to requests and identified needs.

Continuing Education activities fall into three main categories: on- and off-campus credit courses, non-credit activities, and learning opportunities mediated via technology. Admission to NDSU is required to enroll in Continuing Education courses which are numbered 601 or above. Individuals interested in enrolling in degree eligible credit activities must complete application procedures through the Graduate School.

Admission Information

Admission Requirements

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 and including appropriate affirmative action efforts, for all individuals without regard to age. color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, race, religion, sex, sexual orientation, status as a U.S. veteran, 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.

Admission to the Graduate School is a selective process intended to identify applicants who are outstanding among recipients of baccalaureate degrees.

The following minimum qualifications are required of all students seeking an advanced degree:

1. The applicant must have a baccalaureate degree from an educational institution of recognized standing.
2. The applicant must have adequate preparation in the chosen field of study and must show potential to undertake advanced study and research as evidenced by academic performance and experience.
3. At the baccalaureate level, the applicant must have earned a cumulative grade point average (GPA) of at least 3.0, or equivalent, to attain full standing in a graduate degree program. Applicants whose last degree completed is a graduate degree may be admitted in full standing if the final GPA of that degree is at least 3.0 or equivalent.

Each program may set higher qualifications and may require the submission of additional evidence of academic performance.

A student shall be permitted to register for graduate study only after formal admission. Programs make recommendations on all applications, but the final admission decision is the responsibility of the Dean of the Graduate School.

Application Requirements

All application materials are due one month before registration for U.S. applicants; some programs have earlier deadlines. (See program sections within the Graduate Bulletin for details.) For international students, the completed application packet and required test scores must be received by the Graduate School prior to May 1 for Fall Semester and prior to August 1 for Spring Semester unless the department has other posted deadlines. There is additional paperwork for international applicants.
This deadline applies to students matriculating from abroad because of the time required to obtain current financial information, determine student status, and issue the appropriate immigration form.

Official transcripts (transcripts in a sealed, stamped envelope from the granting institution) of all previous undergraduate and graduate records must be received by the Graduate School before the application is considered complete. When a transcript is submitted in advance of completion of either under-

graduate or graduate studies, an updated transcript showing all course credits, grades, and degree completions must be provided prior to initial registration at NDSU.

Online letters of recommendation are required before action is taken on any application. We do not accept paper letters. Click on Application Materials for the number of letters required by each program. Programs requiring or recommending Graduate Record Examination (GRE) or scores Graduate Management Admission Test (GMAT) are indicated on their information pages.

Language Proficiency for Admission

English proficiency must be demonstrated prior to admission by obtaining a minimum score of 525 (paper-based test) or 71 (internet-based test) on the Test of English as a Foreign Language (TOEFL) or a score of 5.5 on the (IELTS). Some programs require higher scores for admission to their degree programs. The test date must be within two years of the date of the application to the Graduate School. Information about these tests is available on our website.

The TOEFL or IELTS score may be waived for students from countries where English is the official language and for students who have recently earned a degree from a U.S. university or college.

Action on Applications

Admission of all graduate students requires approval by the Dean of the Graduate School. All applicants who have submitted the required application materials, will receive admission decisions by email. of action taken on their request for admittance to the Graduate School.

Admission Status

Graduate students will be admitted under one of the following classifications:

Full Graduate Standing

These students have met all requirements for admission and have been accepted by a program leading to a graduate degree. A student must have full graduate standing to receive a graduate degree.

Conditional Standing

Students in conditional standing do not meet all requirements for admission or have deficiencies in prerequisite course work but show potential for successful graduate study. Evidence must be provided showing that the applicant's potential is not adequately reflected by his or her record. In making this recommendation, the program must specify standards of performance that must be satisfied for a change in status to full graduate standing.

Any student admitted in CONDITIONAL status is automatically placed on academic WARNING until the conditions of admission are met. If a student on academic warning fails to achieve a cumulative GPA of at least 3.0 in the subsequent semester of attendance, the student will be placed on academic probation. The student may not earn more than 12 semester hours of graduate credit while in conditional status.

Students admitted under conditional status may, in consultation with their major adviser, request a change to full graduate standing after demonstration of specified capability in graduate studies using the Change of Admission Status form. This request containing the academic justification for the change is to be made to the Dean of the Graduate School by the major adviser and approved by the program administrator. Eligibility for graduate assistantships will be determined by the program. Students with conditional status cannot become candidates for a degree; they must achieve full graduate standing.

Non-Degree Enrollment

Individuals who hold a baccalaureate degree from an institution of recognized standing may enroll as

non-degree students. 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. To become a non-degree student, individuals must complete an application form and submit the appropriate fees. Students must have the prerequisite courses or background/experience necessary for the course or courses in which they desire to enroll. This may require consultation and approval from course instructors. In courses with limited enrollment, preference will be given to degree-seeking students.

Students enrolled with non-degree status are not eligible for graduate assistantships, tuition waivers, or federal title IV student financial assistance. Students in this category are affiliated with the Graduate School and not an academic program. No more than 10 credits taken under the non-degree status with a grade of B or higher can be transferred to any official program of study should there be, at any future date, a decision to seek degree classification. Professional development graduate courses (numbered 600) are not eligible for graduate degree programs and may be taken without formal admission to NDSU.

Change in Classification
Students enrolled with non-degree status may subsequently desire to be considered for admission to the Graduate School to pursue an advanced degree. Such a change in status may be accomplished for a subsequent term by submitting a complete application to the Graduate School as a degree-seeking student. The student must be acceptable to a specific program. Appropriate course credits (no more than 10) earned in the non-degree status may be used to fulfill graduate degree requirements if approved by the student's program committee and the Dean of the Graduate School. No course taken in the non-degree status for which the grade is less than B will be permitted on a plan of study for a graduate degree.

Medical Insurance

Domestic Students
Students are not required to have insurance to receive care at the Student Health Service. However, students are strongly encouraged to have health insurance coverage in the event of a health care crisis.

- International students are required by the state of North Dakota to purchase health insurance.
- Many students are eligible to stay on their family health insurance program. Consult your insurance provider to determine if this option is available to you.

Students also have the option of subscribing to the Student Health Insurance Policy available through the North Dakota University System. Contact Student Health Services for information or stop in at Student Health Services to pick up a brochure. To request more information online: StudentBlueND.com. Health insurance brochures are available in the Student Health Service, in the Vice President for Student Affairs office in Old Main, Room 100, or online: StudentBlueND.com.

The detailed information can be obtained from the NDSU Student Health Service, Wellness Center, and phone: (701) 231-7331.

International Students
International students are required by the North Dakota State Board of Higher Education to purchase the Board approved health insurance policy before they are allowed to register. 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. Because of the increasing cost of health care in the United States, health insurance for a student's spouse and accompanying dependents is highly recommended and is included in

the estimate of expenses for accompanying dependents. In addition, the state of North Dakota requires proof of immunity to measles, mumps, and rubella prior to registration for courses.

Contact the Office of International Programs by phone at (701) 231-7895 or by e-mail: ndsu.international@ndsu.edu, for the details of the international graduate student group policy.

Federal Financial Aid

Students applying for federal aid must be 1) a citizen or eligible non-citizen of the United States with a valid Social Security number, 2) enrolled in an eligible program as a regular student seeking a degree or certificate, 3) registered for a minimum number of credits during each term aid is received, 4) making satisfactory progress toward the completion of a course of study, and 5) current in repayment of previous federal loans. Students owing a refund on a Pell or Supplemental Educational Opportunity Grant are not eligible for federal student assistance.

Financial Aid for International Students

Many students from other nations inquire about financial aid. Local fellowships or free tuition are not ordinarily available to international students. All international students must demonstrate adequate funding for the duration of the graduate program; an assistantship can be part of this funding. Expenses are approximately $22,284 (U.S.) per year for a single person and approximately $27,654 (U.S.) for a married couple. These two dollar figures do not include transportation to and from the U.S.

International students with outstanding ability are encouraged to apply. If the applicant requires an assistantship, the individual should submit an application for graduate school to the Graduate School and a separate inquiry to the major department. Such appointments usually are made before April 15.

North Dakota State University has established a process for verifying communication skills for all personnel whose appointments include classroom instruction. These policies may be found on page 5 in this bulletin.

Teaching or Research Assistantships

A number of well-qualified graduate students, upon recommendation from the department concerned, are employed either as teaching or research assistants by most academic departments of the university. Inquiries should be directed to the appropriate department chair). Tuition is waived for individuals officially appointed as research or teaching assistants who meet all requirements. Student activity fees are not waived.

Regular scholarships for graduate students are limited. Interested graduate students should contact the dean of their college and/or their department chair regarding scholarships available within their discipline.

Graduate School Policies

General Policies

Scholastic Standards

To be in academic good standing and to receive a graduate degree, a student must have a cumulative grade point average (GPA) of at least 3.0.

All courses taken by a graduate student for which grades are given will be used in calculating the grade point average, except where a course has been repeated. Both grades will appear on the transcript, but

only the second grade will be used in calculating the grade point average. (A specific course can be retaken only once, and only three total courses can be retaken). Satisfactory or Unsatisfactory is assigned for research credits, and they are not used in calculating the GPA.

In fulfilling graduate course requirements on any plan of study, only grades of A, B, or C are acceptable. For master's paper (797), master's thesis (798), and doctoral dissertation (799), only the grade of satisfactory (S) is acceptable. For seminar (790/890), case studies (792/892), individual study/tutorial (793/893), practicum/internship (794/894), or field experience (795/895), only grades of A, B, C, or S are acceptable for graduate credit.

Programs and/or supervisory committees may require a higher performance than C in certain courses. While some courses may be used for graduate credit with a grade of C, courses with grades of D, F, and U may not be used for graduate credit. Acquisition of more than two grades of C, D, F and U may be grounds for dismissal upon recommendation by the program administrator.

These minimal scholastic requirements apply to each student enrolled in the Graduate School. Additional requirements may exist for certain graduate programs.

Academic Warning

Any student in GOOD STANDING whose cumulative grade point average drops to less than 3.0 at any time of attendance is automatically placed on academic WARNING. Any student admitted in CONDITIONAL status because of grade deficiency is automatically placed on academic WARNING. A student on academic WARNING cannot register for following semester until the grades for the current semester post.

If a student on academic WARNING fails to achieve a cumulative grade point average of at least 3.0 in the subsequent semester of attendance, then the student will be placed on academic PROBATION.

Academic Probation

A student on academic PROBATION may not continue the pursuit of the graduate degree program without a waiver from the Dean of the Graduate School acting on a recommendation from the appropriate program administrator. This recommendation must include a review of the student's status and a proposed plan of remediation which will allow the student an opportunity to return to a cumulative grade point average of at least 3.0 within one additional semester. If the cumulative grade point average is not at least 3.0 after this one additional semester, the student will be dismissed from his or her graduate program.

A student on academic PROBATION is not eligible for a graduate assistantship or tuition waiver.

Enrollment Status

Nine credits are considered a full-time graduate load. To receive financial aid, students must be enrolled at least half-time (i.e. 5 credits). Loan deferment may also require full or half-time status. Eligibility varies with financial aid programs and students should contact their lender for requirements.
Graduate Assistants working 20 hours per week are considered full-time if registered for five or more graduate credits. Federal law requires all international students with a 20-hour per week assistantship to carry at least six graduate credits for full-time status. Graduate students wishing to register for more than 15 credits in a regular semester shall secure the approval of their department chair and the Dean of the Graduate School.

Graduate Courses

Courses approved at the 600 and 700 level may be taken for graduate credit and used to satisfy course requirements on the student's graduate plan of study. Didactic courses are those courses approved for

graduate credit numbered 601-689, 691, 700-789 and 791. Courses numbered 690; 692-699, 790, and 792-799 are considered special or experimental courses and are not to be included as didactic courses on a 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.

Continuing Education Graduate Courses

Graduate courses administered through the Office of Distance and Continuing Education (DCE) are eligible for graduate degree plans of study if they carry a permanent course number, or the 691/791/891 or 696/796/896 designation. Courses numbered 691/791/891 are trial courses and course numbered 696/796 are special topic courses; courses 691/791/891 are viewed as didactic courses. The 696/796/896 courses can be counted as didactic courses if they are later approved as permanent courses. Graduate tuition waiver does not cover DCE courses.

Courses designed for professional advancement are given the number 600. Although such courses are considered graduate level, they cannot be included on NDSU graduate degree plans of study.

Course instructors must be full or associate members of the NDSU graduate faculty or approved in advance by the administrator of the unit whose course prefix is used, the appropriate academic dean, and the Graduate Dean.

Registration for Research Credit

A student conducting research for the disquisition is to be enrolled in 797, 798, or 799 for the number of credits specified on the plan of study. Such registration is required even in absentia when faculty and/or administration time is consumed in manuscript review, communication, and other forms of assistance.

Time Limitations

Graduate credit for any coursework that is more than seven (7) calendar years old at the time of the final examination cannot be used to satisfy a master's degree program. The analogous time limitation for a doctoral degree is 10 years. Following the final examination, the candidate has one (1) year during which to provide the Graduate School a disquisition for which the graduate dean will sign final approval of all requirements for the degree. Should the disquisition not be deposited as specified or any other degree requirements not be completed within this time limit, the student must repeat the final examination.

Continuous Enrollment

Students are required to register for at least one credit each semester (fall and spring) until all degree requirements are completed, including submitting the final copy of a thesis, paper, or dissertation. The graduate dean will not approve the degree until the student has registered for the number of credits of research for any semesters not covered by either registration or leave of absence, but not more than four (4) credits total.

A student who has not registered for longer than a continuous two-year period must also reapply for admission and is subject to the degree requirements at the time of readmission.

Leave of Absence

Students who interrupt their graduate program prior to the completion of all degree requirements must maintain continuous enrollment for the Fall and/or Spring Semesters of the absence or obtain a leave of absence, using the Request for Leave of Absence from Graduate Studies form.

NOTE: Leaves of absence do not amend in any way the seven and ten-year time limitations.

Master's Program Policies

Supervisory Committee

The supervisory committee should be formed during the term immediately after the major adviser is identified for the student, and members should be identified before the plan of study is formulated so all committee members have a chance to contribute to the Plan of Study.
The supervisory committee will have at least three members. The members consist of

1. The major adviser, who must be a full or associate member of the graduate faculty. The student selects the adviser with approval of the program administrator and the Dean of the Graduate School. The major adviser-student relationship must be a mutually acceptable one. The major adviser will act as the chair of the student's supervisory committee and will be in charge of the Plan of Study. The remaining members of the committee must be agreed upon by the student, the major adviser, and the Dean of the Graduate School.
2. A second member, who must be a full or associate member of the graduate faculty.
3. A third member, who could be either a faculty member or a qualified off-campus expert in the field. If this committee member is not a full or associate member of the graduate faculty, the approval of the Dean of the Graduate School is required. Approval by the dean requires a recommendation from the program administrator accompanied by rationale and curriculum vitae.

NOTE: Other qualified individuals may participate as committee members following approval by the Graduate Dean upon a recommendation accompanied by rationale and curriculum vitae by the appropriate program administrator and academic dean.

The supervisory committee agreed upon by the major adviser and student, and approved by the program administrator and the academic dean shall be recommended to the Dean of the Graduate School for final approval.

Plan of Study

The Plan of Study shall be appropriate to meet the interests and needs of the student in his or her chosen field as determined by the supervisory committee and approved by the program administrator and the Dean of the Graduate School. The Plan of Study should be submitted to the Graduate School for approval not later than the term immediately after the supervisory committee is formed and must be filed in the Graduate School prior to scheduling the final examination. Revisions may be made later as advisable and necessary, but must be approved by the student, all supervisory committee members, the administrator of the student's program, and the graduate dean.

The Plan of Study shall include the specific courses the student is expected to complete and any other special requirements of the particular master's degree that the student is seeking. The total credits will be determined by each program but must not be less than 30 graduate credits.

For the Thesis Based Masters, of the required minimum 30 graduate credits, at least 16 credits must be approved for graduate credit numbered from 601-689, 691; 700-789, 791; 801-889 and 891 while the research credits (798) must be not fewer than 6 nor more than 10 credits. Once these minimum requirements have been met, any other graduate courses can be used to satisfy the remaining Plan of Study requirements.

For the Comprehensive Study Based Masters, of the required minimum 30 graduate credits, at least 21 credits must be completed using courses approved for graduate credit numbered from 601-689, 691; 700-789, 791; 801-889 and 891 while the research credits (797) must be not fewer than 2 nor more than 4 credits.

The various programs determine which approved graduate courses may be used. For specific requirements, the student should consult the specific programs.

Transfer of Credit

All graduate credits used to meet the requirements of a master's degree must be approved by the supervisory committee, the program administrator, 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 9 semester hours of graduate credit from another institution to satisfy course requirements on the plan of study. A student may use up to 10 credits taken as a non-degree NDSU graduate student towards the degree.

Courses listed in the Graduate Bulletin of the Tri-College University Educational Leadership Program are not considered transfer credits and can be included on programs of study without petition. All other Minnesota State University Moorhead graduate credits are subject to the minimums of transfer credits and to the policies given in the text.

Transfer credits

1. must have been earned from a U.S. or Canadian institution accredited to offer graduate courses and degrees (Credits from international institutions can be transferred only if approved by a committee from the student's program)
2. must carry only grades of A or B on a 4.0 scale
3. must have been earned within a 7-year period at the time of the final examination
4. must be graduate level
5. must not be a continuing education, correspondence, extension, or workshop course
6. must not be internship, individual study, special problem, or research (disquisition) courses, or courses graded Pass/Fail or Satisfactory/Unsatisfactory
7. must not have been used to fulfill the requirements of a baccalaureate degree
8. must be verified by an official transcript
9. will not be used in calculation of the grade point average. It is the responsibility of the student to provide official transcripts of graduate courses taken elsewhere to the Graduate School. NOTE: The Special Problem credits of item (6) above are equivalent to North Dakota State University's 696/796 Special Topic credits.

Time Limitation

Graduate credit for any course work which is more than seven (7) calendar years old at the time of the final examination cannot be used to satisfy degree requirements. The final examination must be retaken if the final five (5) copies of the approved disquisition are not delivered to the Graduate School within one (1) year of the date of the final examination or if any other degree requirements have not been completed within one (1) year of the date of the final examination.

If a period of time two years or greater lapses before the final copies are submitted, the student must reapply to the Graduate School, re-defend the thesis and must register for a minimum of two (2) credits. Degree date is based on the date when **final** copies are submitted to the Graduate School.

Language Requirements

Each graduate program 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,

which will certify the proficiency in the specified foreign language by signing the program of study in the appropriate place. International students whose native language is not English may satisfy the language requirement in their native language, providing their graduate program approves. In these cases, the basis for proficiency will be the candidate's use of English, rather than the foreign language.

Final Examination

The candidate shall pass a final examination (either oral or written as specified for the degree) before being awarded the master's degree. The supervisory committee shall serve as the examining committee of which the major adviser shall serve as chair. Substitutions must be approved by the Dean of the Graduate School.

The final examination shall cover the course work taken by the candidate and also the disquisition, seminar papers, or oral examination paper and knowledge fundamental thereto. The candidate shall prepare for each member of the committee a written statement describing the Plan of Study, i.e., a list of courses, instructors, credits, grades, and dates taken. Permission to schedule the examination must be requested of the Graduate School by the student's major adviser using the Request to Schedule Examination form. The request to schedule must be received by the Graduate School at least two (2) weeks prior to the examination. The notification by the Graduate School will confirm this scheduled examination.

The disquisition in a near final form must be given to the committee members no fewer than seven (7) days prior to the examination. If this stipulation cannot be met, the student must either secure the concurrence of all committee members or reschedule the examination. At the conclusion of the examination, the examining committee shall record, in writing, approval or disapproval. The Report of Final Exam must be filed with the Graduate School within seven (7) days of the exam.

A negative vote by more than one member of the student's committee will signify failure of the final examination. The student may repeat the examination only upon permission from a majority of the supervisory committee. The committee will set a date at least one month after the failed examination. Exceptions to this time limit will be considered by the graduate dean upon presentation of written justification from the chair of the committee in consultation with the committee.

Should the examination be failed twice, the student will not be given a third examination except by recommendation of the examining committee, program administrator, and special approval of the Dean of the Graduate School following consultation with the Graduate Council.
Continuous enrollment is required until all degree requirements are completed, including submitting final copies of a thesis, paper, or dissertation.

To participate in commencement, the student must have passed the final examination seven days prior to the commencement ceremony.

Degrees Offered

Master of Accountancy (M.Acc.)

The Master of Accountancy program at North Dakota State University is a non-thesis, professional program structured to advance the knowledge of qualified students with an undergraduate accounting degree.

Master of Architecture (M.Arch.)

The Master of Architecture degree is a non-disquisition, professional degree program structure to serve qualified students who hold a 4-year pre-professional degree in architectural studies.

Master of Arts Requirements (M.A.)

Two types of Master of Arts degrees are offered: The Thesis Based Masters or the Comprehensive

Study Based Masters. Candidates for the Master of Arts degree will meet the general requirements and those specific requirements in the humanities or social and behavioral sciences. These normally include 2 years of a foreign language.

Master of Athletic Training (MATrg)
The Master of Athletic Training a professional program that is accredited by the Commission on Accreditation of Athletic Training Education (CAATE). The MATrg will prepare students to take the Board of Certification, Inc. (BOC) examination and earn the 'ATC' credential. Didactic courses and clinical experience courses focus on prevention, assessment, treatment and rehabilitation of injuries resulting from physical activity.

Master of Business Administration (M.B.A.)
The Master of Business Administration degree is a non-disquisition, professional degree program structured to serve qualified students with any undergraduate degree. The program has two general parts: a foundation course requirement involving up to 30 semester credits and an MBA (common body of knowledge) graduate course requirement of 30 semester credit hours.

Master of Education (M.Ed.)
The Master of Education degree is a non-disquisition, practitioner-oriented degree for teachers and school counselors. Candidates for this degree will meet the general requirements as well as specific requirements established by the School of Education.

Master of Engineering (M.Engr.)
The Master of Engineering in Electrical and Computer Engineering is a course-work only program requiring a capstone consisting of a portfolio or written exam. Faculty are experienced researchers in the following areas: Signal Processing Group, Biomedical Engineering, Power/Power Electronics, Integrated Circuit, Electromagnetics, and Computer Engineering. The ECE Department is also a key contributor to NDSU's Research and Technology Park.

Master of Managerial Logistics (M.M.L.)
The Master of Managerial Logistics is a 36 graduate credit professional degree program targeted specifically at career military officers, Department of Defense civilians, and other logistic professionals.

Master of Music (M.M.)
The Master of Music in performance and conducting is the professional degree in music designed for performers and conductors wishing to augment and refine their skills. The M.M. in Music Education is designed for music teachers who wish to update and increase their practical pedagogical knowledge.

Master of Natural Resources Management (MNRM)
The Master of Natural Resources Management degree is designed as a professional, non-thesis degree program specifically designed for students holding a Bachelor of Science Degree in Natural Resources Management or a closely related field who are seeking an educational opportunity for advanced coursework culminating in a professional terminal degree.

Master of Public Health (M.P.H.)
The Master of Public Health program is a cooperative program between North Dakota State University and University of North Dakota that offers diverse tracks in public health that build upon the strengths of both campuses to meet the practical needs of the public and health care practitioners who serve it. The program focuses on rural health, health promotion and prevention, disease state management, and related activities of interest to North Dakota public health care practitioners and policy makers. Specific tracks of concentration at NDSU include pharmacy, emergency management and preparedness, health promotion, and infectious disease.

Master of Science Requirements (M.S.)
North Dakota State University offers master's degrees in three broad categories. Plan A master's includes completion of a thesis including an oral defense. Plan B master's includes an individual creative component other than a thesis and includes an oral defense. Plan C master's includes coursework accompanied by a well-defined culminating experience.

A program need not offer all three types of master's degrees. The types of degrees offered should be justified based on relevant criteria such as pedagogy or principles appropriate to the field. Programs wishing to grant a Master of Science degree or a Master of Arts degree typically need to satisfy the requirements of either the Plan A or the Plan B options. The Plan C degree is primarily intended for professional degree programs. In addition, the three plans differ in the composition of the student's supervisory committee and required submissions to the Graduate School upon degree completion.

The Plan A degree requires the completion of a thesis. The thesis would typically include a problem statement, a review of existing literature relevant to that problem, and the creation and presentation of new knowledge in providing a solution to the problem. Each student would assemble a supervisory committee as described in the graduate bulletin section titled General Requirements for a Master's Degree. Each candidate is required to pass a final oral examination in which the supervisory committee serves as the examining committee. Following a successful defense, the candidate will submit copies of their thesis to the Graduate School as described in the graduate bulletin.

The Plan B degree generally requires a student to develop a thorough understanding of existing knowledge and the ability to apply that existing knowledge to a problem of interest. Under this degree, the student would generate an individual creative component which reflects a solution to the problem. Note that under this degree, the new knowledge being created is limited, and this is the primary difference between the Plan A and Plan B degrees. The new knowledge created under the Plan B degree need not meet the standard set forth under the Plan A degree. The precise nature of the individual creative component is defined by the program with approval by the graduate school. Examples of possible creative components include a comprehensive paper, a portfolio, or an integrated field experience. As under the Plan A degree, each candidate would assemble a supervisory committee and pass a final oral examination. Following a successful defense, the candidate will compose an executive summary or assemble other appropriate documentation as defined by the program to be submitted to the graduate school. This submission to the Graduate School is to be approved by the student's supervisory committee.

The Plan C degree is designed for degree programs in which a well-defined culminating experience is more important than is an individual creative component. This degree will most frequently be available in professional degree programs. If a Plan C degree is available the program must provide to the Graduate School a rationale for the use of the culminating experience and a plan for implementation. Under this degree, each program will define a culminating experience such as a capstone course, a written examination, or some other approach to measure the candidate's understanding of the relevant material in the area. The student's supervisory committee would generally consist of faculty solely from within that discipline. The supervisory committee may specify that a certain level of performance (i.e., a minimum GPA) be obtained in specified courses or in the program itself. Upon completion of the appropriate coursework and culminating experience, the candidate will be considered to have completed their masters and their name will be forwarded by the program to the Graduate School. Plan C programs do not require the candidate to submit any other documentation to the Graduate School.

Master of Transportation and Urban Systems (MTUS)
The Master of Transportation and Urban Systems is a non-disquisition degree that is primarily intended for professional planners and engineers. Students in the M.S. and MTUS programs can select from a common set of courses. However, students enrolled in the non-disquisition (MTUS) program have more opportunities for synthesis of practice and additional course work, with less emphasis on research.

Education Specialist (Ed.S.) in Educational Administration
In addition to offering several Master of Education (M.Ed.) programs preparing candidates for administration credentials in North Dakota, the Educational Leadership program is an integral part of the Tri-College University (a consortium of North Dakota State University, Minnesota State University Moorhead, and Concordia College) which prepares students for Master of Science (M.S.) and Education Specialist (Ed.S.) degrees in Educational Administration. Programs meet certification requirements in the various areas appropriate to elementary and secondary administration. Information can be secured from the Tri-College University Office or the NDSU Graduate School.

Multiple Graduate Degrees
On occasion, a student may be allowed to work at satisfying the requirements of two graduate degrees concurrently. In completing all program and Graduate School requirements for two degrees, a maximum of nine (9) graduate credits of course work can be applied to both programs of study as approved by all members of both supervisory committees, the two program administrators, the academic dean(s), and the Dean of the Graduate School. A student pursuing multiple graduate degrees must maintain continuous enrollment in each program.

The disquisitions must differ substantially and must result from substantial work completed independently in each discipline. There are two final examinations. The appropriate time limitation applies to all course work.

Master's Degree with Two Major Areas
Under special circumstances, a student may pursue one master's degree with two major areas. Such a program must have the concurrent recommendation of the administrators of the two programs. The plan of study shall clearly delineate the course work required for each major area. A minimum of 40 credit hours is required, including at least 14 graduate course credits in each of the two major areas. No more than 10 of the required 40 credits shall be research credits under the Thesis Based Masters while no more than 3 of the required 40 credits shall be paper credits under the Comprehensive Study Based Masters. The student is required to conduct interdisciplinary scholarly work culminating in a disquisition acceptable in both major areas.

Thesis Based Degree
Under the guidance of the major adviser, each candidate shall prepare a thesis approved by the administrator of the major program and acceptable to the oral examination committee and to the Dean of the Graduate School. Of the 30 graduate credits required, a minimum of 16 credits must be in courses approved for graduate credit numbered 601-689, 691, 700-789, and 791 (referred to as didactic courses); thesis credits must not be fewer than 6 nor more than 10 credits. The thesis bearing the approval of the major adviser shall be in the hands of the examining committee at least seven (7) days before the final oral examination. The candidate shall consult the major adviser regarding the form in which the thesis is to be presented. General instructions on the thesis format are included in the North Dakota State University Graduate School's Guidelines for the Preparation of Dissertations, Theses, and Papers. The thesis is the basis for opening the oral examination.

Comprehensive Study Based Degree
This option is offered in certain fields where the candidate may benefit more from a broader range of knowledge than from the preparation of a thesis. Of the 30 graduate credits required, a minimum of 21 credits must be in courses approved for graduate credit numbered 601-689, 691, 700-789, and 791 (referred to as didactic courses). The research credits(797) must not be fewer than 2 nor more than 4.

The creative component (paper, portfolio, etc.) bearing the approval of the major adviser shall be in the hands of the examining committee at least 7 days before the final oral examination. The creative component must demonstrate ability to do scholarly study appropriate to the major field and present evi-

dence of appropriate written expression. The creative component is the basis for opening the oral examination. General instructions on the format for papers are included in the North Dakota State University Graduate School's Guidelines for the Preparation of Dissertations, Theses, and Papers
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IRB, IBC, and/or IACUC Approval

If a proposed graduate research project involves human, animal, or biohazard subjects, it must be submitted for review and approval by the Institutional Review Board (IRB), the Institutional Animal Care and Use Committee (IACUC), and/or the Institutional Biosafety Committee (IBC). This process should be initiated by the student after his or her supervisory committee has approved the final research design because IRB, IBC, and/or IACUC approval must be obtained **before** the research project commences and cannot be granted retroactively. Please include a copy of the appropriate approval letters when the dissertation is submitted for editing.

Disquisitions which involve research using human or animals as subjects or biohazard materials will not be approved by the Graduate School if such research has not been previously approved by the Institutional Review Board (IRB), Institutional Animal Care and Use Committee (IACUC), or Institutional Biosafety Committee (IBC) as appropriate. Every effort should be made by advisers to see that students are aware of these University requirements.

Filing the Thesis or Paper

After the final examination, the student incorporates into the thesis or paper corrections suggested at the oral examination. Once the corrections are made, the student submits the signed approval page and the IRB/IACUC/IBC Compliance Notification to the Graduate School. The student also makes payment at this time. The disquisition with a second approval page integrated into it are submitted to the Graduate School electronically. After a review process to check for formatting, approval of the final version of the disquisition will be granted by the Graduate Writing Coordinator.

The student will have 1 year from the date of the final examination to submit the final electronic version of the disquisition and complete all other degree requirements. Should the disquisition not be deposited as specified or any other degree requirements not be completed, the student must retake the final examination and request an extension. If a period of time two years or greater lapses before the final copies are submitted, the student must reapply to the Graduate School, retake the final examination, register for a minimum of 2 credits and request an extension.

Degree date is based on the date when the **final** copy is submitted to the Graduate School.

Doctoral Degree Policies

Degrees Offered

Doctor of Musical Arts (D.M.A.)

The D.M.A. is the terminal professional practical degree in music, designed for performers and conductors wishing to acquire the highest performance abilities.

Doctor of Nursing Practice (D.N.P)

The Doctor of Nursing Practice degree is a clinical doctorate offered for post baccalaureate nurses with specialization as a Family Nurse Practitioner. An individually-tailored program of study for the DNP is also available for the certified advanced practice nurse with a master's degree.

Doctor of Education (Ed.D.)

The Doctor of Education (Ed.D.) is available in Institutional Analysis and Occupational and Adult Education. The degree requires extensive field service involving qualitative and/or quantitative research, leading to a dissertation that will apply a theory at an institution.

Doctor of Philosophy (Ph.D.)
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 prescribed examinations, and the development of an acceptable dissertation covering some significant aspect of a major field of learning.

Supervisory Committee

The supervisory committee should be formed during the term immediately after the major adviser is identified for the student, and members should be identified before the plan of study is formulated so all committee members have a chance to contribute to the plan of study.

The supervisory committee will have at least four members. The members consist of

1. The major adviser, who must be a full or associate member of the graduate faculty. The student selects the adviser with approval of the program administrator and the Dean of the Graduate School. The major adviser-student relationship must be a mutually acceptable one. The major adviser will act as the chair of the student's supervisory committee and will be in charge of the Plan of Study. The remaining members of the committee must be agreed upon by the student, the major adviser, and the Dean of the Graduate School.
2. A second member, who must be a full or associate member of the graduate faculty.
3. A third member, who could be either a faculty member or a qualified off-campus expert in the field. If this committee member is not a full or associate member of the graduate faculty, the approval of the Dean of the Graduate School is required. Approval by the dean requires a recommendation from the program administrator accompanied by rationale and a curriculum vitae.
4. The Graduate School appointee, who must be a full member of the NDSU graduate faculty from outside the student's program. This appointment is made by the graduate dean, but suggestions as to whom the appointee might be are welcome. The role of the Graduate School appointee is to ensure that the student's Plan of Study follows Graduate School guidelines and that other Graduate School policies are observed. The Graduate School appointee also ensures that the expectations for the student's performance are reasonable and that interactions with the supervisory committee are conducted on a professional basis.

NOTE: Other qualified individuals may participate as committee members following approval by the Graduate Dean upon a recommendation accompanied by rationale and curriculum vitae by the appropriate program administrator and academic dean.

The supervisory committee agreed upon by the major adviser and student, and approved by the program administrator and the academic dean shall be recommended to the Dean of the Graduate School for final approval.

Each committee member shall have an equal vote in committee decisions. The committee is to assist the student in the preparation of a plan of study and to advise him or her during the period of graduate work. 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.

Plan of Study

The Plan of Study will be prepared by the student and the major adviser. It shall be approved by the supervisory committee, program administrator, academic dean, and Dean of the Graduate School.

The Plan of Study should be submitted to the Graduate School for approval not later than the term immediately after the supervisory committee is formed and must be filed in the Graduate School prior to scheduling the comprehensive/preliminary examination. Revisions in the program of study must be approved by the student, supervisory committee, program administrator, and Dean of the Graduate School. The graduate dean will officially notify the student, supervisory committee, program administrator, and the academic dean of all changes.

Each program has the responsibility of defining the requirements for a major in its disciplinary area. The total credits will be determined by each program but must not be fewer than 90 semester graduate credits, of which not fewer than 27 credits must be in courses approved for graduate credit numbered 601-689, 691, 700-789, and 791 (referred to as didactic courses). Of these 27 credits, not fewer than 15 credits must be in 700-level course work (700-789 & 791). A student matriculating with a master's degree, including a degree earned at an international institution, must earn not fewer than 60 graduate credits at NDSU. Of these credits, not fewer than 15 credits must be NDSU courses at the 700 level (700-789 & 791). For specific requirements, the student should consult the specific programs.

Transfer of Credit

All graduate credits used to meet the requirements of a doctoral degree must be approved by the supervisory committee, the program administrator, the academic dean, and the Dean of the Graduate School.

The doctorate requires 27 credits of course work, and of these, no more than 12 may be transferred by the petition process. Course work which is transferred does not reduce the total requirement of 60 credits for students with a master's degree in the same discipline.

Courses listed in the Graduate Bulletin of the Tri-College University Leadership Administration Program are not considered transfer credits and can be included on programs of study without petition. All other Minnesota State University Moorhead graduate credits are subject to the minimums of transfer credits and to the policies given in the text.

All transfer credits

1. must ordinarily have been earned from a U.S. or Canadian institution accredited to offer graduate courses and degrees (Credits from international institutions are transferable only after examination by a committee from the student's program.)
2. must carry only grades of A or B on a 4-point scale
3. must have been earned within a 10-year period at the time of the final examination
4. must be clearly graduate level (a course listed as both graduate and/or undergraduate level will not be transferred)
5. must not be a continuing education, correspondence, extension, or workshop course
6. must not be internship, individual study, special problem, or research (disquisition) courses, or courses graded Pass/Fail or Satisfactory/Unsatisfactory
7. must not have been used to fulfill the requirements of a baccalaureate degree
8. must be verified by an official transcript
9. will not be used in calculation of the grade point average.

It is the responsibility of the student to provide official transcripts of graduate courses taken elsewhere to the Graduate School.

NOTE: The special problem credits in item 6 are equivalent to North Dakota State University 696/796 Special Topic credits.

Time Limitation

Graduate credit for any course work that is more than 10 calendar years old at the time of the final examination cannot be used to satisfy degree requirements. The final examination must be retaken if the final copy of the approved dissertation is not delivered to the Graduate School within one (1) year of the date of the final examination or if any other degree requirements have not been completed within one (1) year of the date of the final examination.

If a period of time two (2) years or greater lapses before the final copies are submitted, the student must

reapply to the Graduate School and must register for a minimum of two (2) credits. Degree date is based on the date when **final** copy is submitted to the Graduate School.

Language Requirements

Each graduate program 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, which will certify the proficiency in the specified foreign language by signing the Ph.D. program of study in the appropriate place. International students whose native language is not English may satisfy the language requirement in their native language, providing their graduate program approves. In these cases, the basis for proficiency will be the candidate's use of English, rather than the foreign language.

Examinations

A comprehensive/preliminary examination will be required of each student after the greater portion of courses has been completed and any required language proficiency has been certified. This examination consists of a written part and an oral part. 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.

The final examination will be taken after the candidate has completed the course work and dissertation. This oral examination will be concerned primarily with the dissertation, but it may also cover material from course work, especially those courses fundamental to the dissertation.

Permission to schedule the comprehensive/preliminary and the final oral examinations must be requested. Permission to schedule the examination must be requested of the Graduate School by the student's major adviser using the Request to Schedule Examination form. The request to schedule must be received by the Graduate School at least two (2) weeks prior to the examination. The notification by the Graduate School will confirm this scheduled examination.

The examining committee shall consist of the supervisory committee. The dissertation in a near final form must be given to the committee members at least 7 days prior to the final examination.

At the conclusion of each oral examination, the examining committee shall record, in writing, its approval or disapproval of the candidate and file its report with the Dean of the Graduate School. The committee's decision filed on the Report of the Final Examination signifies that the student has been examined with respect to the knowledge required in the major area and that all course work has been satisfactorily completed. This form should be filed in the Graduate School within 7 days.

A negative vote by more than one member of the student's committee will signify failure of either the comprehensive/preliminary examination or the final examination. Upon permission of a majority of the supervisory committee members, a candidate is allowed to take each examination twice. The supervisory committee will set a date at least one month after the failed examination. Exception to this time limit will be considered by the Dean of the Graduate School upon presentation of written justification from the chair of the supervisory committee in consultation with the committee members.

Should both attempts to pass an examination result in failure, the candidate may request to take the ex-

amination a third time. A request for a third examination requires the support of the supervisory committee and program administrator, and the approval of the Dean of the Graduate School after consultation with the Graduate Council.

Continuous enrollment is required until all degree requirements are completed, including submitting final copies.

To participate in commencement, the student must have passed the final examination.

IRB, IBC, and/or IACUC Approval

If a proposed graduate research project involves human, animal, or biohazard subjects, it must be submitted for review and approval by the Institutional Review Board (IRB), the Institutional Animal Care and Use Committee (IACUC), and/or the Institutional Biosafety Committee (IBC). This process should be initiated by the student after his or her supervisory committee has approved the final research design because IRB, IBC, and/or IACUC approval must be obtained **before** the research project commences and cannot be granted retroactively. Please include a copy of the appropriate approval letters when the dissertation is submitted for editing.

Disquisitions which involve research using humans or animals as subjects or biohazard materials will not be approved by the Graduate School if such research has not been previously approved by the Institutional Review Board (IRB), Institutional Animal Care and Use Committee (IACUC), or Institutional Biosafety Committee (IBC) as appropriate. Every effort should be made by advisers to see that students are aware of these University requirements.

Dissertation

The dissertation must show originality and demonstrate the student's capacity for independent research. It must embody results of research which constitute a definitive contribution to knowledge.

Filing the Dissertation

After the final examination, the student incorporates into the dissertation corrections suggested at the oral examination. Once the corrections are made, the student submits the signed approval page and the IRB/IACUC/IBC Compliance Notification to the Graduate School. The student also makes payment at this time. The disquisition with a second approval page integrated into it are submitted to the Graduate School electronically. After a review process to check for formatting, approval of the final version of the disquisition will be granted by the Graduate Writing Coordinator.

The student will have 1 year from the date of the final examination to submit the final electronic version of the disquisition and complete all other degree requirements. Should the disquisition not be deposited as specified or any other degree requirements not be completed, the student must retake the final examination and request an extension. If a period of time two years or greater lapses before the final copies are submitted, the student must reapply to the Graduate School, retake the final examination, register for a minimum of 2 credits and request an extension.
Degree date is based on the date when the **final** copy is submitted to the Graduate School.

Graduate Certificate Policies

The goal of Graduate Certificate (GC) programs at NDSU is to provide didactic course experiences that form a distinct knowledge or skill set identified as a named certificate. Origination and planning of each GC will occur within Graduate Certificate program committees hosted by an academic program. Interdisciplinary programs are encouraged, and in such cases, primary contributors will be listed as host programs.

Admission

Applicant must

1. Have a baccalaureate degree from an educational institution of recognized standing.
2. Provide official transcripts documenting any and all degrees.
3. Be approved for admission by the program administrator hosting the graduate certificate program and by the Dean of the Graduate School.
4. Have an academic adviser assigned by the program administrator of the respective Graduate Certificate program before being admitted by the Graduate School.
5. If English is not the applicant's first language, have a TOEFL or IELTS score equivalent to that needed for master's or doctoral programs in the unit or provide sufficient documentation of adequate or better English language proficiency.

Admission into a Graduate Certificate program does not guarantee admission into a graduate degree program nor imply the waiver of any requirements for admission into a graduate degree program.

Completion

1. Only grades of C or higher will satisfy requirements for course completion. Cumulative GPA on all credits taken at NDSU since admission must be 3.0 or better.
2. Candidates apply for certificate issuance using a form provided by the Graduate School.
3. The Dean of the Graduate School, using official NDSU transcripts, will verify course completion and issue a certificate. Upon issuance of the certificate, the dean will notify the program administrator hosting the GC program.
4. Courses used to satisfy the Graduate Certificate program requirements cannot be older than seven years at the time the certificate completion is verified.
5. There might be a public recognition of individuals who complete Graduate Certificate programs.
6. Transcripts will list Graduate Certificate program and the name of the completed certificate program.

Administration

The Graduate School will administer GC programs.

1. Each GC program will be determined by a committee. Each committee will be comprised of three to five graduate faculty members. The committee must determine the program outcome(s) and designate the courses that meet that outcome. Graduate Faculty committee members must indicate their approval by signing the final program description. The host program administrator must also sign in approval. Committee chairs must be full members of the NDSU Graduate Faculty and be selected by the committee. The chair will reconvene the committee at least annually, and whenever program changes are appropriate, to review the program.
2. Committees will provide outcome or descriptive information to the Graduate School that will establish and maintain a Web site to advertise and explain NDSU graduate certificate programs to potential candidates. The site will list courses for each certificate, admission requirements, past completers (with permission), etc. The Graduate School must be sure that the site is updated at least annually.
3. Graduate Certificate program candidates who do not have active Graduate Master's (GM) or Graduate Doctorate (GD) classifications will be classified as GC.
4. Since GC is not a degree track, federal Title IV student financial assistance and tuition waivers will not be available for students classified as GC.
5. Students classified as GM or GD may pursue Graduate Certificate programs.

Program administrators will monitor and report GC completions in program reviews, annual reports, and other summative documents. Faculty should be given credit for GC participation in merit/tenure considerations.

Approval Process for Graduate Certificate Programs

The approval process will be the same as that of degree programs. The usual supporting documentation is outlined: http://senate.ndsu.edu/acadaffairs/

Signatures are required from

1. Program administrator of the host academic program
2. College Curriculum Committee
3. Academic Dean
4. Graduate Council and Dean of the Graduate School
5. University Academic Affairs Committee
6. University Senate
7. State Board of Higher Education

Curriculum Development

Committees will develop programs with a minimum of 8* credits in specific graduate-level didactic courses which can be completed preferably within one year but no more than three years. * Different certificates may have higher credit requirements.

No more than 3 transfer credits may be applied towards the certificate. Any transfer credits must be approved by the GC program committee.

Review and Maintenance

1. The Graduate School will ask the University Senate Program Review Committee to include Graduate Certificate programs as a separate section of its review of programs.
2. The Graduate School will request that the Provost and Vice President for Academic Affairs ask the State Board of Higher Education to drop a Graduate Certificate program at any such time as 1) there have been no certificates issued in any three-year period or 2) following the recommendation of a Graduate Certificate committee that its program be dropped.
3. The Graduate School will provide a yearly report on the state of NDSU Graduate Certificate programs to the Graduate Council, the University Senate Academic Affairs Committee, the Provost and Vice President for Academic Affairs, each academic dean, and the Director of Distance and Continuing Education.
4. The Dean of the Graduate School or a designee will interview (in person or by phone) each person completing a Graduate Certificate program.

The Dean of the Graduate School or designee will obtain evaluative information about NDSU Graduate Certificate programs from the employers of certificate program completers who give the Dean of the Graduate School permission to obtain such evaluative information and from other sources such as professional associations.

Graduate Assistantship Policy

Introduction

Graduate assistants are typically full-time graduate students who participate in teaching, research, or administrative activities in exchange for financial support at North Dakota State University . Graduate assistantships and fellowships are awarded to graduate students who, based on their credentials, are deemed likely to be highly successful as students. Graduate assistantships contribute to student professional development with the primary purpose of assisting students in the successful completion of their academic program. Activities that are relevant to each student's program of study and contribute to the university's teaching, research/creative activity, or service efforts should be incorporated. Each assistantship requires periodic oral and written assessment and feedback regarding a student's performance. Students receiving a graduate assistantship or fellowship are expected to maintain good academic standing and satisfactory progress toward their degrees. Please refer to the section on Graduate School Policies for more information.

Eligibility for Assistantships

Each graduate program must develop a procedure for the awarding of graduate assistantships. Recommendations for assistantships are made to the graduate dean and are subject to the dean's approval. Graduate programs may have specific requirements for eligibility and need to develop a procedure to periodically assess the performance of graduate assistants. Graduate assistantships may also be awarded outside of the student's home program. These assistantships require the continued approval of the graduate program administrator and the graduate dean.

Before any assistantship can be awarded, students must be admitted to the Graduate School as a degree-seeking student. Students placed on Academic Warning may retain their assistantship. Students placed on Probation may no longer receive an assistantship. The tuition discount may be reduced by other financial awards directed specifically to pay tuition.

Teaching assistants whose native language is not English need to demonstrate English proficiency (refer to section titled "English Language Proficiency for Teaching Assistants").

Assistantship Expectations

Students must be registered for credit each semester they receive an assistantship. Students must dedicate the required number of hours to assigned work each week. In addition, international students must maintain the appropriate residency status.

Assistantship appointments may vary in length and are contingent upon the availability of funding. Some assistantships are granted for one academic term or year with reappointment dependent upon performance review. Other assistantships are for multiple years with annual performance reviews. A general guideline for maximum time allowed is two to three years for a master's student and four to five years for doctoral students. Additional time may be approved, on a case-by-case basis, if the work being accomplished by the student warrants such action.

Stipend Levels

Graduate assistantship stipends vary by discipline. A full-time assistantship consists of 20 hours/week. For information on the current minimum stipend level for a full assistantship, refer to graduate student handbooks for the specific department and/or departmental web site information. Departments may award stipends of less than the full-time amount, but they must reduce the workload accordingly.

The responsibilities associated with a graduate assistantship may be variable in nature. The hour commitment defined by an assistantship may be averaged across a given time period. For example, a teaching assistantship of 20 hours/week should total to 320 hours across the 16 weeks of the academic term. In these cases, students should be given adequate advance notice of these variable expectations so that they can adjust their schedules to meet the requirements of the assistantship. Supervisors must also remain sensitive to the academic demands faced by graduate students.

Students receiving graduate assistantships also receive tuition waivers. To be eligible for a tuition waiver, the assistantship must be at least 160 hours per semester and must pay at least the federal minimum wage. Partial tuition waivers are not given when a graduate assistant works less than 160 hours in the semester. The tuition waiver may have limitations depending on the assistantship appointment.

Additional Employment at NDSU

Graduate assistants on full assistantships are not allowed to work on a second assistantship, as part-time instructors, as student workers, or in any other capacity for NDSU while working as a graduate assistant unless an exception is approved by the graduate dean *prior to the work being performed* .

Exceptions may be granted for a few hours of extra work for a specific job (for example, administering

an occasional exam, teaching an occasional music lesson, or working at a special event held on a weekend), but not for regular additional hours. Additional work performed during the Winter or Spring breaks is allowed. Additional hours may also be appropriate during the Summer term, depending upon the student's credit load for the Summer term. Exceptions must be recommended in writing by the student's supervisor; approved by the student's advisor; and the student's department or program administrator and forwarded to the Graduate School . The Graduate School notifies Payroll that an exception has been granted. These steps must be completed in the order described and before the student begins work.

Rights and Privileges of Graduate Assistants

Graduate assistants have certain rights and privileges specific to the assistantship experience:

- The right to be notified in writing of all decisions that affect their status as a graduate assistant. This includes advance notification of evaluation procedures and a summary of their performance evaluation.
- The right to be notified of any complaints received by a supervisor or department chair concerning their performance of duties.
- The right to respond in writing to such complaints.
- The right, depending on the availability of departmental and university resources, to be supported in pursuing additional activities that pertain to their professional development.
- The right to balance their assistantship responsibilities with their responsibilities to their academic program so that they can complete their degree in a timely manner.
- The privilege of being treated as a professional in their chosen field of study.

Termination

Graduate assistants may have their assistantship terminated by the graduate dean, upon recommendation by their supervisor, with probable cause. Early termination for cause may occur when

- A student does not abide by the appointment conditions.
- A student fails to perform tasks as assigned.
- A student does not make adequate degree progress.
- A student is placed on Academic Probation.
- A student does not make satisfactory research progress.
- A student fails to maintain minimum registration.
- A student persistently refuses to follow reasonable advice and counsel of faculty in carrying out assistantship obligations.
- A student fails to comply with responsibilities as an employee set forth in the *Graduate Bulletin*, department rules and regulations governing assistantships, or the terms of sponsored research agreements that fund the assistantship.
- A student's personal conduct is seriously prejudicial to the university, including violation of the NDSU Code of Student Behavior, state or federal law, and general university regulations.

Appeals Process

The North Dakota State University philosophy is to encourage and seek resolution of problems at the level most closely related to the origin of the specific disputes. This means

- The first step should be an informal conference to first discuss and attempt to resolve the problem(s) with the person(s) directly involved.
- When a mutually satisfactory resolution cannot be reached or if discussion of the problem(s) seems inappropriate because of the nature of the student's complaint, the student should seek advice from the chair of the department.
- Depending on the nature of the problem(s), the department chair or student's graduate committee chair may deal with the situation directly, advise the student to discuss the problem(s) with the ap-

propriate academic dean and/or the graduate dean, or advise the student of the appropriate grievance procedure to pursue.

- If the graduate assistant wishes to challenge the termination decision, a written appeal to the dean of the Graduate School must be made within two weeks of notification of the mediation results (refer to section titled "Graduate Student Appeals").
- Students should not carry more than a full-time load. Individual departments will determine a minimum and a maximum number of credit hours.

English Language Proficiency Procedure for Graduate Teaching Assistants

1. All students awarded a Graduate Teaching Assistantship (GTA) involving any type of teaching responsibility, including lectures, labs, or tutoring shall be evaluated with respect to overall communication proficiency during the 3rd week of the first semester of his or her teaching duties. While the format may be determined by individual units, the evaluation must be documented and it must address the comprehensive English proficiency of the teaching assistant, including speaking and listening ability, commensurate with his or her assigned duties. A copy of the evaluation instrument and the results for each teaching assistant shall be made available to the Graduate Dean upon request.

In addition to the above evaluation, the following requirements must be met:

2. Domestic GTAs and international GTAs possessing a US bachelor's degree or higher are not required to present a TOEFL score, provided that the degree included a minimum of two years in residence. In all other cases, the requirements in #3 below apply.
3. International GTAs whose first language is not English and who do not meet the criteria in #2 above must meet minimal requirements on measures of general English language proficiency, spoken English language proficiency, and written English language proficiency. At the present time, the accepted measure of language proficiency will be the TOEFL ibT, IELTS or the PTE Academic.

There will be two recognized categories:

- Graders are individuals who will have no direct contact with students in their role as a Graduate Teaching Assistant. Effective Spring 2011, graders must have a minimum TOEFL ibT score of 79 (IELTS of 6.5; PTE Academic of 53) and must score at or above the 40th percentile on the TOEFL ibT Speaking and Writing subscales (19 and 21, respectively). The IELTS equivalent scores are 5.5 and 6.0 respectively, and the PTE Academic equivalent is 51 and 56. Individuals may serve in this capacity for no more than 1 calendar year. To continue as a GTA, students must meet the criteria presented in the following paragraph.*
- All other GTAs must have a minimum TOEFL ibT score of 81 (IELTS of 7; PTE Academic equivalent of 54), a TOEFL ibT Speaking subscale score of 23 or above and a TOEFL ibT Writing subscale score of 21 or above. The IELTS equivalent scores are 6.0 for both, and the PTE Academic equivalent is 62 and 56, respectively.

*The one-year requirement for graders will not be enforced until the offering of advanced English language courses for teaching assistants.

Test Score Requirements

		Grader	Teaching Assistant
Total Score	ibT	79	81
	IELTS	6.5	7
	PTE Academic	53	54
Speaking	ibT	19	23
	IELTS	5.5	6.0
	PTE Academic	51	62
Writing	ibT	21	21
	IELTS	6.0	6.0
	PTE Academic	56	56

Graduate Student Appeals

The North Dakota State University philosophy is to encourage and seek resolution of problems at the level most closely related to the origin of the specific disputes. This means

1. the student is to first discuss the problem(s) with the person(s) directly involved;
2. if the student is not satisfied after discussing the problem with the person(s) directly involved or if discussion of the problem(s) seems inappropriate because of the nature of the student's complaint, the student should seek advice from the administrator of the program; and
3. depending on the nature of the problem(s), the program administrator or student's supervisory committee chair may deal with the situation directly, advise the student to discuss the problem(s) with the appropriate academic dean and/or the Dean of the Graduate School, or advise the student of the appropriate grievance procedure to pursue. Areas of possible graduate student appeal are equal opportunity, academic evaluation via assignment of course grades, sanctions for academic dishonesty, and degree-acquisition processes that are unique to graduate education. The burden of proof by a preponderance of the evidence is on the graduate student making the appeal.

Equal Opportunity

North Dakota State University's general and specific commitment to being an equal opportunity institution is expressed elsewhere in this bulletin. As stated there, inquiries concerning compliance may be directed to the Vice President of the Division of Equity, Diversity and Global Outreach (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.

Academic Evaluation

The University Senate Grade Appeals Board has the authority to hear charges of inequitable or biased academic evaluations and to provide redress for any improper evaluations as it may find to have actually taken place. This is for course grades assigned by instructors in charge of the courses. This includes grades of disquisition courses. Both the "Rights & Responsibilities of Community: A Code of Student Behavior," which is available from the Office of Vice President for Student Affairs, and Section 337 of the NDSU Policy Manual, have the procedural details. Salient points repeated here are that the student must initiate a request for a change of grade with the instructor within 15 instructional days of the first day of the semester immediately following the semester in which the grade was awarded. During an actual appeal, the burden of proof is on the student. The Grade Appeals Board procedures are for student grievances against instructors over course grades assigned.

Academic Dishonesty

Procedures dealing with issues of academic dishonesty in meeting course requirements, such as cheating, plagiarism, or other academic improprieties, brought by instructors against students enrolled in their course(s) or other NDSU course(s) or persons not enrolled at NDSU but viewed by the instructor as involved in the academic dishonesty are detailed in both the "Rights & Responsibilities of Community: A Code of Student Behavior" and Section 335 of the NDSU Policy Manual referenced in the preceding paragraph. A substantial range of penalties to the student(s) is available to the instructor(s) and academic deans of the colleges involved, i.e., the college offering the course(s) and the college of which the student(s) is (are) a member. One option available to the deans is to recommend suspension or expulsion from the university. The decision to impose any penalty or disciplinary sanction for prohibited academic conduct against a graduate student in meeting the requirements of either an undergraduate or graduate course may be appealed by said graduate student to a graduate student appeals committee provided there is documentation, in writing, of consultation with instructor(s), program administrator(s), and dean(s), in sequence, to resolve the conflict. This appeal starts with a written notice to the Dean of the Graduate School. The written notice must be accompanied by the aforementioned documentation and must be received by the Dean of the Graduate School within 6 weeks of the most recent date on the documentation.

There are processes and activities that are intrinsic to the acquisition of a graduate degree. The processes include specification of degree requirements, preliminary and qualifying examinations, disquisition writing and approval, and possible dismissal from the program or the Graduate School. The activities for which faculty have primary responsibility include instructing students enrolled in courses; mentoring students; collecting, analyzing, and presenting for public consumption the sequent results and conclusions; and possibly working with proprietary information. Problems in these areas are to be discussed with the chair of the graduate student supervisory committee and administrator of the program, in that order. Normally, these faculty members will attempt to work out a resolution of any problem by bringing the parties involved together in an informal, nonadversarial manner. Inquiry at this stage is usually limited to a determination of 1) whether the graduate student has been treated in an arbitrary or capricious manner or in some way not consistent with previously announced policy guidelines or 2) whether the graduate student has acted in a manner inconsistent with formal or traditional standards of academic conduct.

Conflicts not satisfactorily resolved at the program level are to be brought to the academic dean who will discuss the problem(s) with all interested parties. If resolution does not result at the academic dean level, an appeal can be brought to a graduate student appeals committee as long as there is documentation, in writing, that the graduate student has consulted the graduate student's supervisory committee chair, the program administrator, and the academic dean in attempts to resolve the conflict. This appeal starts with a written notice to the Dean of the Graduate School. This written notice must be accompanied by the aforementioned documentation and must be received by the Dean of the Graduate School within 6 weeks of the most recent date on the documentation.

Graduate Student Appeals Committee

The Dean of the Graduate School is responsible for forming a graduate student appeals committees and informing the committee members of their duties. A graduate student appeals committee has 5 members, all of whom must be graduate faculty or currently enrolled graduate students, and will be comprised of the following members:

1. one person not on the Graduate Council appointed by the graduate student initiating the appeal;
2. one person not on the Graduate Council appointed by the party or parties complained against;
3. one person appointed by the Dean of the Graduate School;
4. one graduate student member of the Graduate Council chosen by lot if a graduate student has not been appointed by either contesting party or the Dean of the Graduate School;

5. one current member of the Graduate Council chosen by lot if a graduate student has not been appointed by either contesting party or the Dean of the Graduate School, or two current members of the Graduate Council chosen by lot if a graduate student has been appointed by either contesting party or the Dean of the Graduate School.

The Dean of the Graduate School will serve as an ex-officio and nonvoting member. The administrator (s) and dean(s) of the program(s) and college(s) involved cannot be members of the committee. The 5 appointed committee members elect the chair of the committee from its membership. The graduate student and the party or parties complained against each have the right to challenge, with cause, to the Dean of the Graduate School one membership of the graduate student appeals committee.

The burden of proof shall be with the appealing graduate student. The appealing graduate student has the right to 1) be given due notice in sufficient detail that the accusation is clear and the circumstances of the accusation are detailed enough for meaningful response by the accused and 2) be heard by an impartial body. Each contending party may, if it wishes, be accompanied by one counsel, but any counseling is restricted to 1) what to ask, 2) when not to respond to a question, and 3) how to answer a question. Counsel may not intrude on the hearing. The appeals committee is not bound by rules of legal evidence or procedure and may develop procedures that its members consider to be fair and equitable to the particular circumstance(s). All questioning will be done through the chair of the committee. Committee members can make decisions on available information; nonresponse to questions is available information, i.e., a negative inference can be drawn from the lack of a response. The hearing will be closed unless the student signs a release waiving his or her rights to a closed hearing. The hearing, but not the appeals committee's deliberations, will be tape-recorded.

The decisions and recommendations of the appeals committee shall be by majority vote and will be advisory to the Dean of the Graduate School, who will then be responsible for taking appropriate action (s). Any further appeal shall be directed to the President of the University

Accountancy

Program and Application Information

Department Head:	Dr. Bud Bowlin
Program Coordinator:	Dr. Herbert Snyder
Department Location:	Barry Hall
E-mail Address:	Herbert.Snyder@ndsu.edu
Telephone Number:	(701) 231-8512
Degree Offered:	Master of Accountancy
Application Deadline:	Fall Semester - March 1
	Spring Semester - October 1
	Summer Semester - May 1

Applications received after the deadline will be considered if space allows.

Test Requirements	GMAT
English Proficiency Requirements	TOEFL ibT 79 IELTS 6

Program Description

The Master of Accountancy (M.Acc.) program at North Dakota State University is a non-thesis, professional program structured to advance the knowledge of qualified students with an undergraduate accounting degree. Students without an undergraduate accounting degree may be conditionally admitted to the program and will be required to take a core of undergraduate accounting courses in addition to the graduate courses.

The Master of Accountancy (M.Acc.) program at NDSU is designed to have students complete graduate studies needed to advance their careers whether their career is in public accounting, corporate accounting, or government accounting and prepare them for the Certified Public Accounting (CPA) exam. Our approach to learning combines case study and applied learning in a collaborative environment. The focus of the program is to develop a student's analytical skills, provide students with in-depth accounting knowledge and skills prepare students to identify accounting problems, research the problem and possible solutions through using on-line and other databases, and present a recommended action. The learning environment also provides students the opportunity to draw from the experiences of fellow students from diverse backgrounds as well as interact with corporate, public-accounting, government, and not-for-profit accounting discipline leaders.

Through the College of Business, North Dakota State University's M.Acc. program is fully accredited by AACSB International, the premier accrediting agency in business administration and accounting.

Faculty

Margaret (Peggy) Andersen, Ph.D.
Indiana University, 1989
Field: Accounting

William "Bud" Bowlin, Ph.D.
University of Texas at Austin, 1984
Field: Accounting

James W. Clifton, M.Acc.
University of North Dakota, 1988
Field: Accounting

Thomas D. Dowdell, Ph.D.
Temple University, 2004
Field: Accounting

David Herda, Ph.D.
University of Texas at Arlington, 2010
Field: Accounting

Yongtao "David" Hong, Ph.D.
Drexel University, 2008
Field: Accounting

Fariz Huseynov, Ph.D.
University of Memphis, 2009
Field: Finance

Bonnie Klamm, Ph.D., CPA
Virginia Commonwealth University-Richmond, 1999
Field: Accounting Information System

Michael J. Peterson, Ph.D.
The University of Iowa, 2002
Field: Accounting

Frederick Riggins, Ph.D.
Carnegie Mellon University, 1994
Field: Management Information Systems

Herbert Snyder, Ph.D.
Syracuse University, 1994
Field: Auditing, Forensic Accounting

Ruilin Tian, Ph.D.
Georgia State University, 2008
Field: Risk Management and Insurance

Wei "David" Zhang, Ph.D.
Syracuse University, 2001
Field: Business Administration/Finance

Limin Zhang, Ph.D.
University of Arizona, 2005
Field: Management Information Systems

Jill Zuber, Ph.D.
University of Arkansas, 2007
Field: Accounting

Admission Requirements

NDSU accounting faculty have ample opportunity to assess applicants for the Master of Accountancy program that are currently enrolled in NDSU's undergraduate accounting program or have an accounting degree from NDSU. Consequently, the admission requirements for NDSU accounting majors/ graduates will differ from those required for other applicants.

A. Admission requirements for NDSU accounting majors

1. The applicant's overall undergraduate GPA should be at least 3.0 on a 4.0 scale.
2. The applicant's GPA for upper-division accounting courses should be at least 3.0 on a 4.0 scale.
3. The applicant does not have to complete the GMAT, if the student meets the minimum GPA requirements (requirements A.1. and A.2.).
4. If the applicant's undergraduate GPA is below the 3.0 standards (requirements A.1. and A.2.), provisional admission to the program may be allowed under the following conditions: the applicant has significant post-graduation work experience OR the applicant takes the Graduate Management Admissions Test (GMAT) with the expectation the applicant earns a score of at least 550.
5. If the above requirements are not met, the applicant may be granted conditional admission.
6. Conditional admission is granted solely at the discretion of the program coordinator and/or Admissions Committee.

B. Admission Requirements for Students Graduating with Accounting Major from Tri-College Schools and AACSB accredited Schools

1. The student's overall GPA should be at least 3.0 on a 4.0 scale.
2. The student's GPA for upper-division accounting courses should be at least 3.0 on a 4.0 scale.
3. Applicants do not have to complete the GMAT, if the student meets the minimum GPA requirements (Requirements #1 and #2).
4. If the student's undergraduate GPA is below the 3.0 standards (Requirements #1 and #2), provisional admission to the program may be allowed under the following conditions:

   4.1. The student has significant post-graduation work experience OR
   4.2. The student takes the Graduate Management Admissions Test (GMAT) with an expectation that the student earn a score of at least 550.

5. Students must also submit a letter stating reasons for wanting a Master of Accountancy degree and two letters of recommendation.
6. If the above requirements are not met, the student *may* be granted provisional admission.
7. Provisional admission is granted solely at the discretion of the program director and admissions committee.

C. Admission Requirements for All Others

1. The student has an undergraduate degree from a regionally accredited school.
2. The student's overall GPA should be at least 3.0 on a 4.0 scale.
3. The student's GPA for upper-division accounting courses should be at least 3.0 on a 4.0 scale.
4. The student takes the Graduate Management Admissions Test (GMAT) with an expectation that the student earn a score of at least 520.
5. If the student has not completed the following core courses or their equivalent in their undergraduate program, the student may be provisionally admitted to the program.

5.1. <u>Core courses</u>
5.1.1. ACCT 311 (Intermediate Accounting I)

5.1.2. ACCT 312 (Intermediate Accounting II)
5.1.3. ACCT 320 (Cost Accounting)
5.1.4. ACCT 418 (Tax I)
5.1.5. ACCT 421 (Audit I)
5.2. The student will be expected to complete any missing core courses within the first two semesters of the program.
5.3. Students must meet the minimum GPA standard of 3.0 for all of the core courses for final acceptance into the program.

1. If the student's undergraduate GPA is below the 3.0 standards (Requirements #2 and #3), provisional admission to the program may be allowed under the following conditions:

   6.1. The student has significant post-graduation work experience.
   6.2. The student takes the Graduate Management Admissions Test (GMAT) with an expectation that the student earn a score of at least 550.

2. Students must also submit a letter stating reasons for wanting a Master of Accountancy degree and two letters of recommendation.
3. If the above requirements are not met, the student *may* be granted provisional admission.
4. Provisional admission is granted solely at the discretion of the program director and admissions committee.

D. Conditional status expires and regular admission is granted if the applicant earns a 3.0 GPA or greater on the first nine credit hours of graduate classes he/she takes. See sections A.4., A.5., B.6., and B.7. above.

E. A student who attended a university outside of the United States should submit a transcript evaluation from World Education Services (WES). See www.wes.org.

Financial Assistance

A limited number of graduate assistantships are available through the Master of Accountancy program. The Program Director will send an application for the assistantship to all students who have applied to the program by April 1. The submission deadline is April 15th. Assistantships will be awarded by May 1.

Degree Requirements

The total course requirements necessary to complete the M.Acc. degree will vary depending on the background of the student. Students without an undergraduate accounting degree will be required to take a core of undergraduate accounting courses in addition to the graduate courses required for the degree. See paragraph. B.5. of the Admission Requirements above. A student with an academic background in accounting will need to take 10 graduate-level courses (30 semester credit hours) and should be able to complete the degree in two or three semesters depending on the number of courses a student desires to take in a semester.

The graduate course work for the M.Acc. degree includes four required courses in accounting theory, applied professional research, legal aspects of business, and information resource management. In addition, the student must take five accounting electives from a list of courses that cover fraud examination, taxes, cost management, auditing, international financial reporting standards, and advanced financial accounting. Finally, the student must take one non-accounting elective from a list that includes courses on human resource management, international management, and organizational communications.

Courses Required		Credits
MIS 770	Information Resources Management	3
ACCT 750	Accounting Theory	3
BUSN 730	Legal Aspects of Business	3
ACCT 735	Applied Professional Research	3
	Total Required Credit Hours	12
Select 5 courses from the following list		15
ACCT 755	Financial Statement Analysis	
ACCT 640	Management Control Systems	
ACCT 615	Advanced Accounting	
ACCT 619	Tax Accounting II (Corporate Tax)	
ACCT 610	Fraud Examination	
ACCT 611	Advanced Fraud Examination	
ACCT 622	Audit II	
ACCT 625	Government and Not-for-Profit Accounting	
ACCT 725	International Financial Reporting Standards	
	See Note 1	
Select 1 course from the following list		3
COMM 783	Organizational Communication I	
COMM 784	Organizational Communication II	
MGMT 630	Leadership in Organizations	
MGMT 640	International Management	
MGMT 650	Human Resource Management	
MGMT 671	Leadership in Non-Profit Organizations	
MGMT 750	Organizational Behavior	
COMM 612	Gender and Communication	
COMM 786	Risk in Communication	
TL 727	Organizational Change Management	
Total Credit Hours required for Accounting Masters Degree		30

Notes

1Students cannot take the 600-level course if they took the 400-level course
2Students must complete a minimum of 15SH at the 700-level
3Summer courses are offered if sufficient students register to take the class.

Students that do not have an undergraduate accounting degree from NDSU

Additional accounting elective if you did not take these courses as part of your undergraduate degree

ACCT 620 Accounting Information Systems

You must have completed the following undergraduate courses or their equivalent.

ACCT 311 Intermediate Accounting I

ACCT 312 Intermediate Accounting II

ACCT 320 Cost Management Systems

ACCT 418 Tax Accounting I

ACCT 421 Audit I

Agribusiness and Applied Economics

Program and Application Information

Department Chair:	Dr. William Nganje
Graduate Coordinator:	Dr. Gregory McKee
Department Location:	500 Barry Hall
E-mail Address:	ndsu.agribusiness@ndsu.edu
Telephone Number:	(701) 231-7441
Degree Offered:	M.S.
Application Deadline:	March 1 to be considered for an assistantship
Test Requirements	GRE (for assistantship consideration)
English Proficiency Requirements	TOEFL iBT 79 IELTS 6

Program Description

The Department of Agribusiness and Applied Economics offers two Master of Science degrees:(1) Agribusiness and Applied Economics, and (2) International Agribusiness. Graduates of both programs are prepared to analyze important agricultural development, finance, marketing, policy, production, resource, international trade, and transportation and logistical issues facing society.

The Agribusiness and Applied Economics Master of Science degree include areas of specialization in applied economics, agribusiness, and transportation and logistics.

The Applied Economics area emphasizes course work in economic theory, research methods, and quantitative techniques. The option is designed to prepare students for careers in agricultural economics research in private and public sectors and for Ph.D. programs at other institutions.

The Agribusiness specialization is a broad-based program which combines training in agribusiness management, economic analysis, and agricultural sciences. Training may include biotechnology, processing, and food and environmental safety. Students are prepared for a variety of successful careers in agribusiness by fulfilling the requirements for expertise in quantitative methods and developing a rigorous background in economic theory and research.

The Departments of Agribusiness and Applied Economics and Civil Engineering, in conjunction with the Upper Great Plains Transportation Institute, offer an interdisciplinary graduate program in multimodal transportation. The program includes rural and non-metropolitan planning, highway and railroad engineering, freight transportation operations and economics, and agribusiness logistics and distribution. Both

Faculty

Robert Hearne, Ph.D.
University of Minnesota, 1995
Research Interests: Natural Resource and Environmental Economics

Robert S. Herren, Ph.D.
Duke University, 1975
Research Interests: Economic History, Labor, Money and Banking

Jeremy Jackson, Ph.D.
Washington University in St. Louis, 2008
Research Interests: Microeconomics, Political Economy, Public Finance

Won W. Koo, Ph.D.
Iowa State University, 1974
Research Interests: International Trade, Grain Marketing

Ryan Larsen, Ph.D.
Texas A&M University, 2009
Research Interests: Agricultural Finance, Risk Management

Siew Hoon Lim, Ph.D.
University of Georgia, 2005
Research Interests: Production Economics, Transportation, Industrial Organization

Gregory McKee, Ph.D.
University of California, Davis, 2006
Research Interests: Industrial Organization, Agribusiness, Cooperatives

Dragan Miljkovic, Ph.D.
University of Illinois, 1996
Research Interests: Agricultural Prices, International Trade, Agricultural and Food Marketing and Policy

Frayne Olson, Ph.D.
University of Missouri, 2007
Research Interests: Crop Marketing Strategies, Crop Supply Chain Management, Agricultural Contracting, Agricultural Risk Management

Timothy Petry, M.S.
North Dakota State University, 1973
Research interests: Livestock marketing

Richard Rathge, Ph.D.
Michigan State University, 1981
Research Interests: Demographic Analysis, Labor Force Analysis, Rural Community Research, and Population Impact Assessment

thesis and comprehensive study options are available.

Students of all options have complete access to well-equipped research facilities and to faculty supervision time. (A favorable faculty to student ratio is maintained.) The department has an excellent placement record with national and international agricultural and business firms as well as government agencies.

Admission Requirements

The Department of Agribusiness and Applied Economics graduate program is open to all qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School's requirements, to be admitted with full status to the program, an applicant must have adequate preparation in microeconomic theory, calculus, and statistics.

Students who do not meet all requirements for admission or have deficiencies in prerequisite course work, but show potential for successful graduate study, may be admitted under a conditional status. Evidence must be provided showing that the applicant's potential is not adequately reflected by his/her record. After meeting the specified standards of performance set by the department, the student, in consultation with the major adviser, may request a change to full graduate standing.

It is desirable that students begin their program in the fall semester, although students may also begin their programs of study in January. The application for admission should be received by the Graduate School by March 1 if the student wishes to be considered for financial assistance. International students are advised to submit applications no later than March 31 to ensure VISA documents will be completed for a fall matriculation.

David Ripplinger, Ph.D.
North Dakota State University, 2011
Research Interests: Production Economics and Marketing

David Roberts, Ph.D.
Oklahoma State University, 2009
Research Interests: Natural Resource and Environmental Economics, Econometrics, Production Agriculture

David M. Saxowsky, J.D.
The Ohio State University, 1979
Research Interests: Agricultural Law

Saleem Shaik, Ph.D.
University of Nebraska, 1998
Research Interests: Agriculture Policy and Risk Management, Agriculture Production Economics

Cheryl J. Wachenheim, Ph.D.
Michigan State University, 1994
Research Interests: Agribusiness

Tom Wahl, Ph.D.
Iowa State University, 1989
Research Interests: International Marketing and Trade, Agricultural Trade Policy, Marketing and Price Analysis

William W. Wilson, Ph.D.
University of Manitoba, 1980
Research Interests: Commodity Marketing, Agribusiness, Industrial Organization

Financial Assistance

The Department offers assistantships on a competitive basis. Information about other forms of financial assistance may be obtained from the Financial Aid Office in Ceres Hall. Two types of assistantships are available: the Graduate Research Assistantship (GRA), and the Teaching Assistantship (TA).

The GRA and TA provide a monthly stipend plus tuition waiver. Regardless of the type of assistantship, the student must pay an activity fee each semester. An assistantship normally begins the first semester the student is both at full graduate standing and enrolled in courses that apply to the student's graduate program of study.

Application for financial assistance should be made to the department at the same time as application to the graduate school. Applicants to graduate school who are accepted in less than full standing will not be eligible for an assistantship until their status changes to full standing. Granting assistantships depends on academic performance, departmental needs, and availability of assistantships. Application forms may be obtained from the department.
Most assistantships are half time. Students on assistantships are expected to perform research and other duties in the department in return for their stipend. All half-time assistants are expected to be availa-

ble for performing services related to research or other duties for an average of 20 hours per week. Time expended on the student's research project is recognized as partial fulfillment of this requirement.

Degree Requirements

Candidates meeting all prerequisites for the M.S. degree in Agribusiness and Applied Economics may complete their program in 15-18 months. The degree requires the completion of 30 credit hours of letter-graded course work with an overall GPA of 3.0 or higher. A faculty seminar and an oral defense of either a research-based thesis or paper are required. Plans of study are developed to meet both disciplinary requirements and special interests of the student.

Students pursuing a Master of Science in Agribusiness and Applied Economics (thesis option or comprehensive study option) must complete all core courses. Students select elective courses (with approval of their adviser and supervisory committee) to fulfill the remaining Graduate School credit requirements. The core requirements assure breadth and competence in key areas of knowledge and professional activity. It is required that students **have competence in calculus, multiple regression analysis, and intermediate microeconomic** before enrolling in core courses. The following courses, or their equivalent, constitute the core of the Master of Science program for each area of specialization:
M.S. in Agribusiness and Applied Economics

Required:

AGEC 701	Research Philosophy	1 credit
ECON 710	Advanced Econometrics	3 credits
AGEC 739	Analytical Methods for Applied Economics	3 credits
AGEC 741	Advanced Microeconomics	3 credits
AGEC 797/798	Comprehensive Study or Thesis	

Thesis Option:
Minimum of 16 credits of approved graduate-level course work
6 to 10 credits of AGEC 798 (Thesis)
Minimum of 30 credits of course work and thesis credits

Comprehensive Study Option:
Minimum of 7 credits of quantitative courses (including ECON 610, ECON 710, AGEC 739, AGEC 711 or other approved quantitative courses)
Minimum of 21 credits of approved graduate-level course work
2 to 4 credits of AGEC 797 (Comprehensive Study)
Minimum of 30 credits of course work and comprehensive study credits

Agricultural and Biosystems Engineering

Program and Application Information

Department Chair:	Dr. Sreekala Bajwa
Graduate Coordinator:	Dr. Scott Pryor
Department Location:	Agricultural and Biosystems Engineering Building
E-mail Address:	ndsu.ABENgrad@ndsu.edu
Telephone Number:	(701) 231-7261
Degrees Offered:	Ph.D., M.S.
Application Deadline:	Applications are accepted for fall, spring and summer semester admits. International application materials must be received before May 1 for the fall semester and prior to August 1 for spring and summer semesters. Domestic applications must be received at least one month prior to the start of the semester.
English Proficiency Requirements	TOEFL iBT 79 IELTS 6

Program Description

The Department of Agricultural and Biosystems Engineering offers graduate study leading to M.S. and Ph.D. degrees. The program emphasizes solving engineering problems for agricultural production, food and biofuels processing, and environmental resources management. Advanced work may involve specialized training in the following areas: irrigation and drainage engineering, agricultural hydrology, soil and water resources management, livestock waste management, food process engineering for food and biofuels, bioprocessing, bioproducts, agricultural machine systems, precision agriculture, machine vision and intelligent sensors for biological systems, and post-harvest handling and storage of biomass feedstocks and other biological materials.

Student research and academic programs are tailored to individual student needs and interests. Interdisciplinary approaches to agricultural and biosystems engineering programs are fostered.

Admission Requirements

The Department of Agricultural and Biosystems Engineering graduate program is open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full standing to the program, the applicant must meet the Graduate School's requirements found on page 5 and a baccalaureate degree in engineering or have taken the equivalent of the basic undergraduate en-

Faculty

Sreekala G. Bajwa, Ph.D.
University of Illinois at Urbana-Champagne
Research Interests: Remote Sensing, Modeling, Precision Agriculture, Air Quality, Water Quality, Waste Utilization, Bio-composites

Thomas Bon, Ph.D.
North Dakota State University, 2003
Research Interests: Machine Systems, Electronics and Instrumentation

Ganesh Bora, Ph. D.
Kansas State University, 2005
Research Interests: Precision Agricultural Technology; Machinery Systems Engineering; Agricultural Systems Management; Mechanical Harvesting; Agricultural Energy; Instrumentation

Igathinathane Cannayen, Ph.D.
Indian Institute of Technology, 1997
Research Interests: Biomass Harvest, Storage, Collection and Pre-Processing

Kenneth J. Hellevang, Ph.D.
North Dakota State University, 1989
Research Interests: Post Harvest Technology

Xinhua Jia, Ph.D.
University of Arizona, 2004
Research Interests: Soil and Water Engineering, Hydrology

Zhulu Lin, Ph.D.
University of Georgia, 2003
Research Interests: Water and Soil Resources, Environmental Modeling

Scott W. Pryor, Ph.D.
Cornell University, 2005
Research Interests: Biorenewable Products and Bioprocessing

Shafiqur Rahman, Ph.D.
University of Manitoba, 2004
Research Interests: Livestock Waste Management

Thomas S. Scherer, Ph.D.
University of Minnesota, 1986
Research Interests: Soil and Water Resources Management, Irrigation Systems

Dean D. Steele, Ph.D.
University of Minnesota, 1991
Research Interests: Irrigation and Environmental Engineering

gineering courses.

Dennis P. Wiesenborn, Ph.D.
Rice University, 1989
Research Interests: Food and Added Value Process Engineering for Food, Biofuels, and Other Bioproducts

Financial Assistance

Research assistantships are available and dependent on the grant funding of faculty research programs. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research. Students must be accepted into the Graduate School before they are eligible for an assistantship.

Degree Requirements

M.S. Degree
The M.S. degree program requires completion of 30 semester credit hours beyond the baccalaureate degree. Twenty to 24 credit hours are from course work while 6-10 credit hours are typically provided for a master's thesis. A Plan of Study should be developed with the adviser by the end of the first semester of work. An oral examination covering the research-based paper or thesis and the student's understanding and ability to apply the subject matter to the research is required. Students typically require two years to complete their MS degree. An overall GPA of 3.0 or higher must be maintained.

Ph.D. Degree
Students entering the MS program usually have a BS degree in engineering; however, students without an engineering degree may pursue the MS degree following the completion of basic engineering science courses.

Ph.D. candidates are encouraged to indicate their research interests when applying for admission and to select an adviser before entering the program. Typically, three years are required to complete the Ph.D. program after the completion of an MS degree.

The degree requirements are in accordance with the NDSU Graduate School requirements. The student's academic advisor will usually be selected during the acceptance process. Prior to the end of the first academic year, the student and academic advisor will arrange for appointment of a Graduate Advisory Committee.

The student and major advisor will prepare a plan of study by the end of the first year in residence. The student's Graduate Advisory Committee, the ABEN Department Chair, Dean of the College of Engineering and Architecture, and the Graduate School Dean shall approve the program of study. The plan of study must be filed in the Graduate School of NDSU. An overall GPA of 3.0 or above must be maintained.

The ABEN Ph.D. program requirements are:

- 60 credits after the M.S. or 90 credits after the B.S.
- A minimum of 27 credits from NDSU courses numbered 601-689 and 700-789, at least 15 credits of which must be numbered 700-789
- A minimum of 30 credits of NDSU ABEN dissertation and graduate seminar after the M.S. or 45 credits after the B.S.
- A minimum of 9 credits of NDSU ABEN courses numbered 601-689 and 700-789, or 15 credits if entering with other than an ABEN B.S.
- It is expected that one or more journal articles will be submitted for publication prior to the award of the degree

Examinations

Comprehensive Examinations: Both a written and an oral examination will be taken after completion of the greater portion of the course work phase of the Ph.D. program. The written examination will be conducted to test the student's understanding and ability to apply the subject matter related to the chosen research area(s). The format and sequence of the written and oral examinations are dependent on the academic advisor and the examining committee. The examination will be graded pass, fail or marginal pass. If the student does not pass the written component of the comprehensive examination, the student will be provided another opportunity to pass the examination. If the student does not pass the written examination second time, the student must wait one semester before taking the examination for the third time. Failure of the third attempt will not allow the student to proceed further in the Ph.D. program.

The oral examination will also be coordinated by the academic advisor. In this examination, the student will be required to provide a short presentation of the research progress to the date of the oral examination. The format of the examination is dependent on the academic advisor and the examining committee. This examination is to assess the student's ability to communicate his/her research problem, and how he/she is applying scientific and engineering principles to solve the research problem. This examination may be used by the committee to further ascertain the student's level of understanding of subject matter as observed from the written examination. This examination is graded pass or fail. If a student fails the oral examination, the student will be advised of the deficiencies and will be given a second opportunity to pass the examination. If the student does not pass the examination in the second time, the student must wait one semester before taking the examination for the third time. Failure of the third attempt will not allow the student to proceed further in the Ph.D. program.

Successful completion of both written and oral examinations will formally admit the student into candidacy for the Ph.D. in Agricultural and Biosystems Engineering. At least one semester must elapse between admission to candidacy and final PhD. oral examination of the dissertation.

Final Examination: After the research work is completed, the student will write a Ph.D. dissertation following the guidelines of the Graduate School . The final oral PhD. examination will be arranged after the approval of his/her academic advisor. The complete Ph.D. dissertation will be distributed to the examining committee members a minimum of two weeks before the final examination. The student will present the complete research work during this final examination. After passing the final examination, the student will complete all the appropriate suggested changes of the committee. The student will follow the procedures as defined by the Graduate School to complete the submission of the Ph.D. dissertation.

Agriculture Education

Program Faculty

Brent Young, Ph.D.
Oklahoma State University, 2006
Research Interests: Building Academic Skills in the Context of Career and Technical Education, Student Learning and Achievement in Agricultural Education, Student teacher-cooperating teacher relationships, Experiential Learning

Program and Application Information

Department Chair:	Dr. William Martin
Graduate Coordinator:	Dr. R. Brent Young
Department Location:	School of Education, FLC 210
Telephone Number:	(701) 231-7921
Degrees Offered:	M.S., M.Ed.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements	TOEFL ibT 71 IELTS 6.5

Program Description

Agricultural Education offers graduate study leading to the M.Ed. and M.S. degrees. Advanced work may involve specialized training in vocational education, extension education, international extension, and agricultural education.

Degree programs are planned cooperatively to meet the needs of individual students. Candidates are encouraged to include supporting work relevant to subject matter areas of interest. Some courses focus on problems related to various phases of Agricultural Education, including secondary, post-secondary, adult, and extension programs. Others emphasize issues common to all service areas in agricultural and extension education. Provision may be made for candidates to include internships in agribusiness, natural resources education, or other aspects of agricultural and extension education in their programs. Candidates should work closely with an adviser.

The NDSU programs in education are accredited by National Council for Accreditation of Teacher Education and are approved by the ND Education Standards and Practices Board. Changes in national and state legislation, standards, or rules can affect academic program requirements.

Admissions Requirements

In addition to the Graduate School's required application materials, the program requires submission of a statement of career goals consistent with the five propositions of the National Board of Professional Teaching Standards NBPTS), http://www.nbpts.org/ as well as reasons for applying to the program.

Admission is considered only after all required application materials have been received and reviewed. Where appropriate, all international student requirements must be met. If a program has a cohort group with enrollment limitations, an entrance interview will be required.

Admission decisions are based upon the predicted success of the applicant as a student and professional in the chosen field and are made only after considering all available data. A student must meet all requirements for full admission.

NOTE: The School of Education reserves the right to obtain additional information about the student's

professional competence from qualified professionals.

Degree Requirements

Master's programs within the School of Education require a minimum of 30 semester credits (minimums vary by academic program). The Master of Science (M.S.) degree requires a disquisition. The Master of Education (M.Ed.) degree is a non-disquisition, practitioner-oriented degree. Programs vary on requiring a written comprehensive exam or a portfolio/oral.

NOTE: Earning an academic/professional degree does not necessarily lead to state credential or licensure. People seeking licensure must provide evidence of the required number of years of teaching or counseling, and, in the case of school administration, administrative experience. Potential and current students should consult with the appropriate academic program coordinator for advice about licensure, certification, or credentialing after communicating with the appropriate state official.

Animal Science

Program and Application Information

Department Head:	Dr. Greg Lardy
Department Location:	102 Hultz Hall
Telephone Number:	(701) 231-7641
Degrees Offered:	Ph.D., M.S.
Application Deadline:	April 15, applications are accepted for fall, spring and summer semester admits.
English Proficiency Requirements:	TOEFL iBT 71 IELTS 6

Program Description

The Department of Animal Sciences offers graduate study leading to M.S. and Ph.D. degrees. Advanced work may involve specialized training in the following areas: animal breeding, animal nutrition, physiology of reproduction, nutritional physiology, and meat science.

Student research and academic programs are tailored to individual student needs and interests. Interdisciplinary approaches to Animal Sciences programs are fostered.

Admission Requirements

The Department of Animal Sciences graduate program is open to all qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School's requirements, to be admitted with full status to the program, an applicant must: have adequate preparation in animal sciences or in a complementary area of life sciences and have a background or interest in agriculture.

Financial Assistance

Research assistantships are available. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research. To be considered for an assistantship, all application materials must be in the Graduate School no later than April 15.

Degree Requirements

The Animal Sciences program has two options for the M.S. degree: the thesis option and the comprehensive study option. The M.S. program requires completion of 30 semester credits of approved graduate and letter-graded course work with an overall GPA of 3.0 or better. The Ph.D. program requires the completion of 90 semester credits (or the equivalent) of graduate approved and letter graded course work with an overall GPA of 3.0 or more.

Each student must choose an adviser, usually based upon area of academic and research interest, within the first program year. By the end of the first year of residence, the student must have selected an advisory/supervisory committee and have an approved graduate plan of study, including a research proposal. The advisory/supervisory committee advises the student and administers the graduate exams to the student. Students are referred to the Animal Sciences Graduate Student Handbook for information regarding additional requirements.

Candidates for the M.S. normally complete their degree requirements in two years. Candidates for the Ph.D. generally complete their degree requirements in three to four years.

The M.S. candidates are required to take an oral examination which covers both the research and academic subject matter covered in their program. Candidates for the Ph.D. are required to take a preliminary written and oral examination directed toward the academic subject matter of their chosen discipline and a final defense of a research based thesis.

Faculty

Marc L. Bauer, Ph.D.
University of Kentucky, 1996
Research Interests: Nutritional Physiology with emphasis on Nutrient Metabolism and Utilization in Ruminants

Erika Berg, Ph.D.
University of Missouri, 2006
Research Interests: The Impact of Therapeutic Horsemanship on Human and Equine Participants. Maternal and Environmental Influence on Equine Neonatal Physiology

Eric P. Berg, Ph.D.
Purdue University, 1996
Research Interests: Influence of Environment, Nutrition, and Genetic Factors as They Impact Meat-Animal Production Efficiency, Health, Carcass Composition, and Meat Quality

Paul T. Berg, Ph.D.
North Dakota State University, 1975
Research Interests: Genetic Selection and Production Parameters, Genetic Implications in Meat Production and Consumer Acceptance, Nutritive Evaluation of Meat

David S. Buchanan, Ph.D.
University of Nebraska, 1979
Research Interests: Quantitative Genetics

Kasey Maddock Carlin, Ph.D.
Iowa State University, 2005
Research Interests: Meat Science with emphasis on Physiological and Biochemical Changes in Muscle Postmortem on Meat Quality

Joel S. Caton, Ph.D.
New Mexico State University, 1987
Research Interests: Ruminant Nutrition with emphasis on Nutrition and Reproduction interactions, Forage Utilization, Digestive Physiology and Selenium Metabolism

Carl Dahleen, Ph.D.
University of Minnesota, 2009
Research Interests: Beef Cattle Production

Anna T. Grazul-Bilska, Ph.D.
University of Agriculture and Technology, Olsztyn, Poland, 1983
Research Interests: Applied and Basic Aspects of Embryology and Ovarian Function in Livestock Species

Carolyn Hammer, DVM, Ph.D.
Iowa State University, 2003
Research Interests: Equine Preventative Medicine, Growth and Development, Immunology

Greg Lardy, Ph.D.
University of Nebraska,1997
Research Interests: Cow-Calf Nutrition, By-Product Utilization, Range Nutrition

Rob Maddock, Ph.D.
Texas A&M University, 2000
Research Interests: Factors Affecting Beef Quality and Value, Consumer Acceptance of Meat Products

David Newman, Ph.D.
North Dakota State University, 2009
Research Interest: Swine Production with an Emphasis in Meat Sciences, Animal Handling/Welfare, Consumer Acceptance, and Meat Animal Production

Chung S. Park, Ph.D.
Virginia Polytechnic Institute and State University, 1975
Research Interests: Nutritional Regulation of Animal Growth, Mammary Development and Lactation

R. Reid Redden, Ph.D.
Montana State University, 2009
Research Interests: Sheep Production with an emphasis on Ruminant Nutrition and Reproductive Physiology

Dale A. Redmer, Ph.D.
University of Missouri, 1983
Research Interests: Regulation of Ovarian and Uterine Function, Including Angiogenesis and Endocrine Control of Follicular and Placental Development in Farm Animals

Lawrence P. Reynolds, Ph.D.
Iowa State University, 1983
Research Interests: Maternal and Placental Physiology During Pregnancy in Livestock Including Cellular and Molecular Aspects

Jerome W. Schroeder, Ph.D.
North Dakota State University, 1999
Research Interests: Metabolic and Nutritional Relationships of Dairy Cattle Related to Milk Quality and Composition

Charles L. Stoltenow, DVM, Diplomate, ACVPM
Iowa State University, 1985
Research Interests: Equine Medicine, Bovine Medicine, Epidemiology, Public Health and Bioterrorism

Kendall Swanson, Ph.D.
University of Kentucky, 2001
Research Interests: Ruminant Nutrition

Kimberly Vonnahme, Ph.D.
University of Wyoming, 2003
Research Interests: Nutritional Impacts on Placental Function in Livestock

Sarah A. Wagner, DVM, Ph.D.
Iowa State University, 2003
Research Interests: Food Animal Pharmacology and Therapeutics, Dairy Cattle Health

In addition to the above listed faculty, there are numerous adjunct faculty members who participate in the graduate program.

Anthropology

Program and Application Information

Department Chair:	Dr. Gary Goreham
Department Location:	107 Reinke Visual Arts Gallery
E-mail Address:	ndsu.anthropology@ndsu.edu
Telephone Number:	(701) 231-8657
Degrees Offered:	M.A., M.S.
Application Deadline:	Applicants who seek funding must apply by February 15 for fall semester and September 15 for spring semester.
English Proficiency Requirements	TOEFL ibT 100 IELTS 7

Program Description

The Department of Sociology and Anthropology offers an M.S. and M.A. degree in Anthropology. The program centers on human heritage past, present and future, cultural and material and it is based on the principle that graduate level education in Anthropology is a desirable preparation for a growing number of career orientations. The precise plan of study for each student is established in consultation with the academic advisor. Graduate students are also expected to enhance their coursework and degree research by engaging in professional development activities such as paper or poster presentations or attendance at academic conferences, campus and community service, and teaching and research assistantships. Sample positions that our graduates have obtained include university and college teaching, contract archaeology, folklore program coordination, international studies administration, not-for-profit program event coordination, teaching English in other countries, and research analysis as cultural experts.

The focus of graduate education in Anthropology is directed toward both the development of applied anthropologists and the advanced training of those seeking to pursue a doctoral degree. Students may elect to take courses in a specialty area, or they may pursue a background in general anthropology. Areas of specialization include cultural anthropology and archeology.

The Anthropology graduate program provides students with the opportunity to expand their background and perspectives in research methods and theory. Consequently, the first year of the program is designed to expose students to anthropological theory and a variety of research methods. Research facilities include the Archaeology Technologies Laboratory and Anthropology Materials Laboratory.

Two program options are available for students. In the thesis option, students work on a research-based thesis. Students typically test the-

Faculty

Jeffrey T. Clark, Ph.D.
University of Illinois at Urbana-Champaign, 1987
Research Interests: Archaeology, digital archaeology, paleoenvironmental studies, archaeological method/theory, heritage and material culture, Oceania, North America

Thomas J. Riley, Ph.D.
University of Hawaii, 1973
Research Interests: Archaeology, archaeological theory, agricultural systems, Polynesia, Micronesia, Eastern North America

Katherine Lafrenz Samuels, Ph.D.
Stanford University, 2010
Research Interests: Cultural heritage, archaeological ethnography, democracy, development, the environment, rights, place-making; transnationalism, Middle East and North Africa, Spain

Joy Sather-Wagstaff, Ph.D.
University of Illinois at Urbana-Champaign, 2007
Research Interests: Cultural anthropology, visual anthropology, sociolinguistics, tourism, violence/disasters, museum studies, cultural heritage and memory, North America, Latin America and the Caribbean

Lecturers

Travis Kitch, M.S.
North Dakota State University, 2003
Research Interests: Archaeology, medical anthropology

Joshua Samuels, Ph.D.
Stanford University, 2013
Research Interests: Historical archaeology, ethnographic archaeology, archaeology of the recent past, heritage ethics, landscape archaeology, GIS, post-conflict reconstruction, totalitarianism, colonialism, cultural resource management, Italy

Emeritus Faculty

Bill B. Brunton, Ph.D.
Washington State University, 1974
Research Interests: Cultural anthropology, shamanism, religion, North American Indians, intergroup relations

Timothy J. Kloberdanz, Ph.D.
Indiana University, 1986
Research Interests: Cultural anthropology, expressive culture and folklore, anthropological theory, Indians of the Plains, peoples of Europe, ethnicity, ethnic groups and heritage

oretical assumptions using primary or secondary data. The comprehensive study option is designed for students who wish to combine their studies with some type of specialized field experience. Students electing this option are required to complete a comprehensive study paper related to their internship, such as evaluating a program.

Students in the Anthropology graduate program benefit from a favorable faculty-to-student ratio.

Admission Requirements

The Anthropology graduate program is open to qualified graduates of universities and colleges of recognized standing. To be admitted with full standing to the program, the applicant must meet the Graduate School's requirements and have adequate preparation in anthropology.

Financial Assistance

Teaching assistantships are available to qualified applicants. Research assistantships may also be available, contingent on faculty research funds. Applicants for assistantships are considered on the basis of scholarship and potential to undertake advanced study and research.

Degree Requirements

The masters degree (M.A. or M.S.) in Anthropology credit requirements consists of a minimum 30 credits (for the thesis option) or 35 credits (for the paper option), of which 16 must be didactic credits. Core requirements include the following:

- Successfully complete a theory-oriented Anthropology course (such as ANTH 680)
- Successfully complete a methods-oriented Anthropology course (such as ANTH 650)
- Complete additional coursework to finish the 30-credit requirement (24 for thesis, 26 for paper)
- Complete a research-based thesis or a comprehensive study paper and pass an oral defense of the thesis or paper administered by the student's supervisory committee.

Architecture

Program and Application Information

Interim Department Chair:	Cindy Urness
Department Location:	Renaissance Hall
Telephone Number:	(701) 231-5788
Degree Offered:	Master of Architecture

Program Description

NDSU offers a 5-year NAAB accredited, first-professional Master of Architecture program housed primarily in a beautifully-restored historic industrial building in downtown Fargo, which has emerged as an exciting, student-oriented urban district. Students entering the graduate program in architecture come directly from the NDSU pre-professional Bachelor of Science in Architectural Studies program. The curriculum includes field trips to cities across the country and is supported by a professionally-staffed wood shop, digital media labs, and laser cutter for model-making. Both traditional and digital media are emphasized. An optional semester abroad, plus foreign study tours during summers are offered.

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

Doctor of Architecture and Master of Architecture degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree that, when earned sequentially, constitute an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

North Dakota State University's Architecture program offers the following NAAB-accredited degree program:

- M.Arch. (pre-professional degree + 32 graduate credits)
  Next accreditation visit: 2012

Admissions Requirements

- Students currently enrolled in the 4-year pre-professional degree at NDSU may apply to the Master of Architecture program.
- Candidates must have earned a cumulative grade point average of 3.0 to be considered for full graduate standing.

Faculty

Bakr Mourad AlyAhmed, Ph.D.
Virginia Tech, 2002
Creative/Research Interests: Beach Resorts Design, Sustainable Design Modeling, Eco-Tourism Development, Building Capacity Measures, Advanced Environmental Planning.

Mark Barnhouse, M.Arch.
Pratt Institute, 1988
Creative/Research Interests: Water Resources and the Built Environment, and the Graphic Interpretation of Parametric Data about the Built Environment.

Darryl Booker, M.Arch.
University of Colorado, 1980
Creative/Research Interests: Sustainable Design, Ethics & Built Environment, Appropriate Technology

Michael Christenson, M.Arch.
University of Minnesota, 1997
Creative/Research Interests: Commonalities between architectural analysis and design; iterative processes; parametric modeling.

David Crutchfield, M.Arch.
University of Texas at Austin, 2004
Creative/Research Interests: Sustainable Design, as the interrelation of nature, economics, equity, and aesthetics; Critical evaluation methods of green design; Innovations and analysis in passive design

Stevie Famulari, MLA
State University of New York , 2000
Creative/Research Interests: Environmental Art, Public Installations, Radical Materiality, Food Arts, Landscape Architecture, Popular Media, Phytoremediation, Sustainability, Indoor/Outdoor Green Design, Landscape Narratives

Don C. Faulkner, M.Arch.
University of Utah, 1975
Creative/Research Interests: Urban Design, Building Community and Public Engagement

Paul H. Gleye, Ph.D.
UCLA, 1983
Creative/Research Interests: Placemaking, Historic Preservation, City Centers

Mark Lindquist, MLA
University of Toronto, 2002

Kaarin Piegaze Lindquist, M.Arch.
University of Toronto, 2002
Creative/Research Interests: Design Process, Human Interaction with the Design Process From Brief to Finished Product, Social/Environmental Sustainability

Ganapathy Mahalingam, Ph.D.
University of Florida, 1995
Creative/Research Interests: Computer -aided architectural design, architectural acoustics, computational modeling of design, interdisciplinary research, architectural philosophy and the Architectural Genome Project

Steve C. Martens, M.Arch. II
University of Minnesota, 1988
Creative/Research Interests: Architectural Problem-Solving, Design Methods, Historic Preservation, Building Materials

Kathleen Pepple, MFA, MCRP
University of North Dakota, 1981;
North Dakota State University, 1991
Creative/Research Interests: Applied research in urban agriculture, its economic influence as a local food source, and its importance as a focal point for community participation; In exploration of the possibilities of functional art within this framework, her north Fargo urban art fence expands the utility of boundaries and perimeters necessary in the context of municipal gardens and farms.

Ronald H.L.M. Ramsay, M.Arch.
University of Texas at Austin, 1992
Creative/Research Interests: Architectural History, Historic Preservation, the Progressive Era, Planning History, Professionalization

Regin Schwaen, M.A.A.
City Building , Arkitektskolen i Aarhus, 1992
Creative/Research Interests: Urban Buildings, Conceptual Models, Minimal Concrete Structures, Visual Communication

Cindy Urness, M.Arch.
Pratt Institute, 1988
Creative/Research Interests:
Building Technology, Urban Design, Utopian Cities, Sustainable Design, Universal Design

Catherine Wiley, MLA
University of Pennsylvania, 1998

Stephen Wischer, M.Arch., MFA
University of Calgary, 2004
Creative/Research Interests:
History /Theory, Existential Philosophy, Interdisciplinary Relationships, Art, Embodied Artifacts, Process, Experience and Poetics, and of Design

Athletic Training

Program and Application Information

Interim Department Head:	Dr. Margaret Fitzgerald
Program Coordinator:	Dr. Pamela Hansen
Program Location:	Bentson Bunker Fieldhouse
Telephone Number:	(701) 231-8093
Degrees Offered:	M.S., MATrg
Application Deadline:	March 1 for Fall admission or until all spots are filled
English Proficiency Requirements	TOEFL ibT 81 IELTS 7

Faculty

Kara Gange, Ph.D.
North Dakota State University, 2010
Research Interests: Modalities

Nicole German, Ph.D.
North Dakota State University, 2008
Research Interests: Critical Thinking, Clinical Practice

Pamela Hansen, Ed.D.
University of South Dakota, 2000
Research Interests: Athletic Training Education, Female ACL injuries, Learning Styles

Kevin Miller, Ph.D.
Brigham Young University, 2009
Research Interests: Exercise Associated Muscle Cramps: Treatments and Pathogenesis, Heat Illness Prevention, Rehydration Strategies for Athletes, Gastric Emptying, Electrolyte and Hydration Balance

Program Description

The Department of Health, Nutrition and Exercise Sciences (HNES) offers graduate study leading to the Master of Science (M.S.) in Advanced Athletic Training and a Master of Athletic Training (MATrg) degree. The HNES department also offers a Master of Science (M.S.) degree in HNES with options in Exercise/Nutrition Science and Dietetics (on line).

Master of Science in Advanced Athletic Training
The MS in Advanced Athletic Training (40 credits) is a post-professional/post certification. The student will be exposed to didactic content in the advanced skills and knowledge of diagnostic evaluation, modalities, technology, and leadership. The program involves extensive research and application of the latest theories and techniques in athletic training and related fields. Clinical practice will enable students to be proactive in the application of new knowledge and skills. This degree is for the student who has graduated with an entry-level athletic training degree from a CAATE accredited program and has earned the “ATC” credential or is eligible to sit for the BOC, Inc. exam. See the MS website for all necessary information regarding application process and additional forms.

Master of Athletic Training (MATrg) in Athletic Training
The Master of Athletic Training (MATrg) is a professional program that is accredited by the Commission on Accreditation of Athletic Training Education (CAATE). The MATrg (40 credits) will prepare students to take the Board of Certification, Inc. (BOC) examination and earn the ‘ATC’ credential. Didactic courses and clinical experience courses focus on prevention, assessment, treatment and rehabilitation of injuries resulting from physical activity. This two year program starts in July!

Option 1: Five year program. This unique option allows the student to complete a baccalaureate degree in Exercise Science and Master of Athletic Training in Athletic Training degree in 5 years.

- At the end of the third year, students apply to and must be admitted into the NDSU Graduate School.
- Students start the MATrg program in July, and take both undergraduate and graduate courses during the fall and spring semesters of their fourth year.
- After meeting all degree requirements and completing the exercise science internship in the summer after their fourth year, students will be awarded a bachelor's degree in exercise science .
- At end of the 5th year the student will complete the MATrg.

- This program is recommended for entering freshmen, student-athletes, and transfer students who want to pursue and athletic training degree at NDSU.

Option 2: Two year program. If you earned a bachelor's degree in a related major from another institution, this option may be right for you.

- Students must meet the admission requirement and be admitted into the NDSU Graduate School.
- The program begins in July and is recommended for students who want to change professions, have earned a bachelor's degree or are student- athletes.

MATrg. Admission Requirements (same for both options) :
Acceptance into the NDSU Graduate School.
Undergraduate overall GPA of 3.0 on a 4.0 scale.

MATrg. Academic Requirements:

- Documentation of 50 hours of observation completed under the direct supervision of a BOC ATC ® in an athletic training room setting.
- Minimum of "C" or higher in the following college courses:
  - Human Anatomy and Lab (1 semester)
  - Human Physiology and Lab (1 semester)
  - General Physics and Lab (1 semester)
  - General Chemistry and Lab (1 semester)
  - Exercise Physiology and Lab (1 semester)
  - Kinesiology/Biomechanics and Lab (1 semester)
  - Medical Terminology (1 semester)
  - Nutrition (1semester)
- Current Lay Responder First Aid/CPR/AED card

After completing this program (40 credits), the student will be eligible to take for the Board of Certification, Inc. (BOC) exam. Certification by the BOC, Inc. is the entry-level credential and is required by most employers. See the MATrg website for all necessary information regarding application process and additional forms.

Financial Assistance

Both research and teaching assistantships may be available. Applications are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. To be considered for an assistantship, a completed Graduate School Application, official transcripts, and three letters of reference must be received by the Graduate School not later than March 1. The department admits students for fall semester only. Students are also required to submit a letter of interest and complete a department application for teaching assistantships after they have been accepted into the department as a graduate student. Letters of interest should be submitted to the department Graduate Coordinator. Graduate assistants teach approximately six credits each semester, receive a financial stipend for their work, and a full tuition waiver for fall, spring, and summer semesters. Assistantships are available contingent upon current funding.

Degree Requirements

The Master of Science in Advanced Athletic Training requires 40 semester credits (thesis option only) and the Masters of Athletic Training requires 40 semester credits (intern option only).

Biochemistry

Program and Application Information

Department Chair:	Dr. Greg Cook
Department Location:	Ladd Hall
E-mail Address:	NDSU.chemistry@ndsu.edu
Telephone Number:	(701)231-8694
Degrees Offered:	Ph.D., M.S.
Application Deadline:	March 1 for fall, September 1 for spring
Test Requirements:	GRE (general required; subject recommended)
English Proficiency Requirements	TOEFL ibT 81 (23 speak; 21 write) –TA; 71 – RA IELTS 6.5 – TA; 5.5 – RA

Program Description

The Department of Chemistry and Biochemistry offers graduate study leading to the M.S. and Ph.D. degrees. The department also participates in the interdisciplinary Ph.D. program in Cellular and Molecular Biology.

At the start of the first year of study, entering graduate students take entrance examinations in chemistry and biochemistry, as well as analytical, inorganic, organic, and physical chemistry. The graduate student progress committee uses these exams for advisory purposes in recommending course work during the first year. As a consequence, programs are individually tailored to the needs of each student.
The chemistry, biochemistry, and molecular biology of plant, animal, insect, and microbial systems are studied through advanced course work and research. Selection of the area of emphasis depends on the interests of the student. Typically, coursework is completed in one to one-and-a-half years for M.S. candidates, and two years for Ph.D. candidates, leaving later years for full-time thesis research. The typical time to complete a graduate degree averages three years for the M.S. degree and approximately five years for the Ph.D.

Faculty

Christopher L. Colbert, Ph.D.
Purdue University, 2000; Postdoctoral, Howard Hughes Medical Institute, 2000-2004
Research Interests: Structure Biology

Glenn Dorsam, Ph.D.
Virginia Commonwealth University,1998; Postdoctoral, University of California, San Francisco, 1998-2002
Research Interests: Transcriptional Regulation

Heldur Hakk, Ph.D. (adjunct)
North Dakota State University, 1997
Research Interests: Fate and Metabolism of Environmental Contaminants

Stuart J. Haring, Ph.D.
University of Iowa, 2004; Postdoctoral, University of Iowa, 2004-2008
Research Interests: DNA Metabolism and Cell Cycle Regulation

S. Derek Killilea, Ph.D.
National University of Ireland, 1972
Research Interests: Metabolic Regulation via Protein Kinases and Phosphatases

Erika Offerdahl, Ph.D.
University of Arizona, 2008
Research Interests: Chemistry/ Biochemistry Education

Sangita C. Sinha, Ph.D.
Purdue University, 2000; Postdoctoral, Howard Hughes Medical Institute, 2001-2005
Research Interests: Structure Biology

D. K. Srivastava, Ph.D.
Banaras Hindu University, 1980
Research Interests: Mechanistic Enzymology

Admissions Requirements

The graduate programs in biochemistry are open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full standing to the program, the applicant must meet the Graduate School's requirements found on page 5 and have adequate preparation for the study of chemistry and biochemistry at the graduate level, and show potential to undertake advanced study and research as evidenced by academic performance and experience.

Applications will be considered at any time. Application materials should be submitted directly to the

Graduate School and need to be received before May 1 to be considered for the upcoming academic year.

Financial Assistance

The student must first apply to the Graduate School and be accepted in full or conditional status before he/she is eligible for an assistantship in the Department of Chemistry and Biochemistry.

Graduate students in the Department of Chemistry and Biochemistry are supported during both the academic year and during summer months by either teaching assistantships (TA) or research assistantships (RA).). As of the 2009-2010 academic year, the standard monthly stipend is $1,683 per month for RAs and $1,750 per month for TAs. University tuition (except for an student activity fee) is waived for all TAs and RAs in good academic standing.

Degree Requirements

The Master of Science program requires the completion of a total of 30 graduate semester credits with an overall GPA of 3.0 or better. This total is comprised of both class work and research credit, but must consist of at least 16 semester credits from letter-graded course work. The Ph.D. program requires the completion of a total of 90 graduate semester credits with an overall GPA of 3.0 or better. This total is comprised of both class work and research credit, but must consist of at least 27 semester credits from letter-graded course work.

Each student chooses a thesis adviser within six months of beginning graduate school. As this is one of the most important decisions made in graduate school, students are strongly urged to visit multiple faculty members to discuss research opportunities. In addition, faculty seminars during the fall semester are designed to acquaint new students with the available research programs.

By the end of the first academic year, each student selects an advisory and examination committee, which consists of the thesis adviser, two other faculty members in the chemistry department, and one faculty member from a department outside the Department of Chemistry and Biochemistry.

Admission to candidacy for the Ph.D. degree is accomplished by satisfying three requirements: 1) satisfactory performance in course work with a minimum 3.0 grade-point average, 2) satisfactory performance on a written comprehensive examination, taken by the end of the 4^{th} semester, and 3) satisfactory defense of an original research proposal on a topic approved by the student's advisory committee. The defense of this proposal must occur at least eight months prior to the final oral examination. Following completion of dissertation research, the candidate must complete a written dissertation and an oral presentation to the department and advisory committee.

Research Opportunities and Infrastructure

The Department of Chemistry and Biochemistry has more than 10 externally funded faculty research programs. Research expenditures have averaged $1.8 million over the last 10 years, with more than $2.2 million in the last 2 years.

All research and most teaching activities within the department occur within three centrally-located buildings, including two connected facilities, Ladd Hall and Dunbar Laboratory, as well as the Industrial and Agricultural Communications Center (IACC) located across the street. Most departmental offices, classrooms and teaching labs as well as some research labs are located in Ladd Hall, while Dunbar and the third floor of the IACC primarily consists of research laboratories. Ladd Hall also houses departmental glass, machine, and electronics shops.

Modern instrumentation is vital to research in the chemical sciences. The quality and quantity of instrumentation within the department has been greatly enhanced in the last few years through aggressive fund-raising efforts and university matching support.

The department has recently upgraded its mass spectrometry capabilities to include a Bio-TOF III with accurate mass analysis, ESI and CI ionization; as well as an Esquire 3000 Plus - an Ion trap instrument with MS-MS and proteomics capabilities. A dedicated LC can be integrated with the both the instruments.

The Organic Spectroscopy Laboratory is primarily devoted to maintenance and operation of Nuclear Magnetic Resonance (NMR) spectrometers. The recently upgraded facility includes three modern high-field instruments: Varian 500, 400, and 300 MHz spectrometers. All have multinuclear, 2-D, and variable temperature capabilities, and the 400 MHz instrument has been recently upgraded for solids capabilities. This center also includes the departmental FTIR.

The Materials Characterization Laboratory houses the departmental crystallography faculties including a Bruker single crystal CCD X-ray diffractometer with low temperature capabilities, a Philips MPD (Multi-Purpose Diffractometer), two Philips X-ray powder diffractometers, and a Kevex X-ray fluorescence unit. CHN Elemental analysis, thermogravimetric analysis (TGA), differential scanning calorimetry (DSC), and differential thermal analysis (DTA) are also available.

The Center for Protease Research - Core Biology Facility is a new facility housing equipment and technical personnel for performing bioassay, cell and tissue culture, and molecular biology experiments. For bioassays, the facility has a fluorimeter capable of top or bottom reading and the capability to handle both 96- and 384-well plates. For sample preparation, researchers can utilize cell and tissue culture capabilities such as flow hoods and culture chambers. In addition, RT-PCR and FPLC protein purification technology is available.

The chemistry library, located in Ladd Hall, provides graduate students and faculty with convenient 24-hour access to more than 200 journals and approximately 10,000 volumes. Literature searching via SciFinder is supported.

Prospective students are encouraged to visit the Department of Chemistry and Biochemistry Web site (http://www.ndsu.edu/chemistry/) for the latest descriptions of research programs and instrumentation.

Biological Sciences

Program and Application Information

Department Chair:	Dr. Wendy Reed
Department Location:	218 Stevens Hall
Telephone Number:	(701)231-7087
E-mail Address:	NDSU.Biology.GSA@ndsu.edu
Degrees Offered:	Ph.D., M.S.
Application Deadline:	Review of graduate applications will take place: by October 1 for the subsequent Spring semester; by February 15 for the subsequent Summer or Fall semesters; by June 15 for the subsequent Fall semester.
Test Requirements:	GRE (general)
English Proficiency Requirements	TOEFL ibT 79 IELTS 6

Program Description

The Department of Biological Sciences offers graduate study leading to Master of Science and Doctor of Philosophy degrees. Master of Science degrees are available in Biology, Botany, Environmental and Conservation Sciences, Natural Resources Management, and Zoology. Doctor of Philosophy degrees are available in Botany, Genomics, Cellular and Molecular Biology, Environmental and Conservation Sciences, Natural Resources Management, and Zoology. Advanced work may involve specialized training in the following areas: aquatic biology, behavior, cell biology, comparative biochemistry and physiology, cancer biology, conservation biology, ecology, endocrinology, developmental biology, evolution, fisheries biology, molecular biology, plant biology, population biology, prairie pothole ecology, systematics, evolutionary ecology , and wildlife biology.

Student research and academic programs are tailored to individual needs and interests. Interdisciplinary approaches to biological problems are encouraged. *Correspondence with one or more departmental faculty members before and during the application process is essential.* For e-mail addresses for faculty members and for additional information about our programs, please visit our Web site at www.ndsu.edu/biology/.

Admissions Requirements

The graduate programs in the Department of Biological Sciences are open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full status to the program, the ap-

Faculty

Julia H. Bowsher, Ph.D.
Duke University, 2007
Research Interests: Evolutionary and Developmental Biology of Insects

Malcolm G. Butler, Ph.D.
University of Michigan, 1980
Research Interests: Aquatic Ecology, Limnology, Fisheries, Water Quality, Wildlife Management

Gary K. Clambey, Ph.D.
Iowa State University, 1975
Research Interests: Ecology and Biogeography, Environmental Analysis and Planning, Structure Function Relations in Midwestern Ecosystems, Human Ecology

Mark E. Clark, Ph.D.
University of Tennessee, 1996
Research Interests: Fish and Wildlife Ecology, Population Biology, Ecological Modeling, Quantitative Ecology

Ned A. Dochtermann, Ph.D.
University of Nevada, 2009
Research Interests: Evolutionary and Behavioral Ecology

Erin H. Gillam, Ph.D.
University of Tennessee-Knoxville, 2007
Research Interests: Evolution and Behavioral Function of Communication Signals Using Bats as a Model

Kendra J. Greenlee, Ph.D.
Arizona State University, 2004
Research Interests: Comparative Physiology, Insect Respiration and Immunology

Timothy J. Greives, Ph.D.
Indiana University, 2009
Research Interests: Hormones and Behavior, Seasonality, Biological Rhythms, Reproductive Ecophysiology

Angela Hodgson, Ph.D.
University of Minnesota, 2010
Research Interests: Ecosystem Biology and Wildlife Conservation Biology

Donna L. Jacob, Ph.D.
University College Dublin, 2003
Research Interests: Wetland Science, Biogeochemistry

plicant must meet all Graduate School requirements found on page 5.

Applications should be submitted directly to the Graduate School. Review of graduate applications will take place: by October 1 for the subsequent Spring semester; by February 15 for the subsequent Summer or Fall semesters; by June 15 for the subsequent Fall semester.

Correspondence with one or more departmental faculty members before and during the application process is essential. For e-mail addresses for faculty members and for additional information about our programs, please visit our web site at http://www.ndsu.edu/biology/.

Financial Assistance

Research assistantships and teaching assistantships are available. Applicants are considered on the basis of scholarship, potential to undertake advanced study and research, as well as financial need. A student must first be accepted by The Graduate School before consideration for financial assistance. Assistantships include a waiver of tuition.

In addition to research and teaching assistantships, there are other types of financial support. A limited number of State Board of Higher Education Scholarships and other fellowships are available through the Graduate School. Outstanding scholarship and financial need are primary considerations for these fellowships. Scholarships in specific areas are also available through the Department of Biological Sciences. These are generally supplemental and do not include tuition waivers. Students are considered for these awards after enrollment, with primary considerations being scholastic performance and research at NDSU.

Degree Requirements

Students must select a major adviser prior to their arrival for graduate studies.

The Master of Science program generally requires a minimum of 24 months of full-time study, during which an overall GPA of 3.0 or better must be maintained. The Master of Science degree may be earned by either of two options. The thesis option emphasizes completion of a research project. The comprehensive study option requires more course work, and instead of conducting research and presenting a thesis, the candidate presents a paper or papers approved by the adviser to the examining committee, demonstrating ability for scholarly study and written expression. Candidates under both options must present a seminar on the thesis research or comprehensive study, and must pass an oral examination.

The Ph.D. program generally requires a minimum of 36 months of full-

Jennifer L. Momsen, Ph.D.
Rutgers, 2007
Research Interests: Biology Education at the Undergraduate Level

Lisa M. Montplaisir, Ph.D.
University of Arizona, 2003
Research Interests: Science Education, Teaching and Learning, Curriculum Development.

Marinus L. Otte, Ph.D.
Vrije Universiteit, 1991
Research Interests: Wetland Science, Biogeochemistry, Plant Ecophysiology

Wendy L. Reed, Ph.D.
Iowa State University, 2000
Research Interests: Physiological Ecology, Evolution of Life Histories, Behavioral Endocrinology

Katie M. Reindl, Ph.D.
North Dakota State University, 2006
Research Interests: Cancer Cell Biology, Identification and Validation of New Drug Targets

Mark A. Sheridan, Ph.D.
University of California-Berkeley, 1985
Research Interests: Animal Physiology/Endocrinology; Control of Growth, Development, and Metabolism in Vertebrates, Especially Fish; Aquaculture; Signal Transduction; in vitro Diagnostics

Craig A. Stockwell, Ph.D.
University of Nevada, 1995
Research Interests: Evolutionary Ecology of Vertebrate Populations, Conservation Biology, Fisheries Biology

Steven E. Travers, Ph.D.
University of California-Santa Barbara, 1998
Research Interests:
Plant Evolutionary Ecology

Emeritus

William J. Bleier, Ph.D.
Texas Tech University, 1975
Research Interests: Blackbirds, Animal Depredation, Avian Ecology

Theodore L. Esslinger, Ph.D.
Duke University, 1974
Research Interests: Lichenology; Taxonomy, Chemosystematics, and Floristics of Lichens; Emphasis on the Parmeliaceae and Physciaceae

time study, during which an overall GPA of 3.0 or better must be maintained. Candidates for the Ph.D. are required to take a preliminary written and oral examination directed to academic subject matter and a final defense of the dissertation.

Most students have selected a major adviser prior to their arrival for graduate studies; however, if a student has not made such a decision, then he/she must select a major adviser within nine months of beginning graduate school. By the end of the first year in residence, the student must select an advisory/ supervisory committee. The committee advises/supervises the student and administers preliminary and final oral examinations.

Research Facilities and Equipment

The Department of Biological Sciences occupies approximately 20,000 square feet of floor space in Stevens Hall for research and teaching. The NDSU Library has extensive holdings of journals, monographs, books, and other reference materials covering various fields in biology. The library offers full access to online catalogs and databases.

Faculty in the department have research programs ranging from molecular biology to ecosystem ecology and work with a wide variety of organisms across multiple levels of organization, from cellular mechanisms to ecosystem function. Modern equipment is available for conducting research in cell and molecular biology and field ecology and behavior. The department has access to a vascular plant herbarium with 240,000 specimens emphasizing Northern Great Plains flora, a lichen herbarium consisting of about 15,000 specimens with a worldwide representation of taxa, and a vertebrate collection with approximately 10,000 specimens.

The department offers access to a range of equipment and facilities necessary for laboratory research including greenhouses, animal rooms, growth chambers, tissue culture facilities, ultracentrifuges, spectrophotometers, electrophoresis, light microscopes, gas chromatography, GC-mass spectrometry, and high performance liquid chromatography. Facilities are available for protein and DNA sequencing; oligonucleotide synthesis; interactive laser cytometry; scanning transmission and electron microscopy, and confocal microscopy.

James W. Grier, Ph.D.
Cornell University, 1975
Research Interests: Eagles and Other Birds of Prey, Herpetology, Aquatic Organisms, Fossils, Animal Population Dynamics, Habitat Ecology

Gary L. Nuechterlein, Ph.D.
University of Minnesota, 1980
Research Interests: Behavioral Ecology of Birds; Wildlife Ecology, Particularly of Non-game Species

Adjunct

Laura Aldrich-Wolfe, Ph.D.
Cornell University, 2006

Michael J. Anteau, Ph.D.
Louisiana State University, 2006

Ned H. Euliss, Jr., Ph.D.
Oregon State University, 1989

Mark A. Hanson, Ph.D.
North Dakota State University, 1990

Douglas H. Johnson, Ph.D.
North Dakota State University, 1986

George M. Linz, Ph.D.
North Dakota State University, 1982

Daniel C. McEwen, Ph.D.
North Dakota State University, 2008

David M. Mushet, Ph.D.
North Dakota State University, 2010

Marsha A. Sovada, Ph.D.
North Dakota State University, 1993

Steve K. Windels, Ph.D.
Michigan Technological University, 2008

Brian Wisenden, Ph.D.
University of Western Ontario, 1993

Business Administration

Program and Application Information

Acting Program Director:	Dr. Ron Johnson, Dean
Department Location:	Barry Hall
E-mail Address:	Barb.Geeslin@ndsu.edu
Telephone Number:	(701) 231-8805
Degree Offered:	Master of Business Administration
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring semester. Domestic applicants should apply at least six-weeks prior to the start of classes.
Test Requirements:	GMAT
English Proficiency Requirements:	TOEFL iBT 79 IELTS 6

Program Description

The Master of Business Administration program at North Dakota State University is a non-thesis, professional program structured to serve qualified students with undergraduate degrees in various fields. The program is designed to provide the student with an effective set of analytical skills, a broad view of the way organizations work, and an understanding of the functional areas of business. The NDSU program takes a generalist approach to graduate business education while providing a variety of electives to give the student the opportunity to pursue a particular area of interest in business or a related discipline.

The NDSU business faculty use a variety of teaching methods: case studies, group and individual projects, field research, computer applications, class discussion, and lecture. The student is able to acquire and improve problem-solving and communication skills and to apply these skills in business situations.
Financial Assistance

The College of Business offers financial assistance through graduate assistantships and scholarships. Applicants must be admitted on a conditional or full-standing basis. Assistantships include a stipend and tuition waiver in exchange for work within the College.

The tuition waiver is limited to graduate course work. Awards are based on academic excellence as determined by grade

Faculty

Margaret Andersen, Ph.D.
Indiana University, 1989
Field: Accounting

Bahman Bahrami, Ph.D.
University of Nebraska-Lincoln, 1983
Field: Managerial Economics, Management Information Systems, Labor Relations and Negotiation

John Bitzan, Ph.D.
University of Wisconsin-Milwaukee, 1997
Field: Economics

William "Bud" Bowlin, Ph.D.
University of Texas at Austin, 1984
Field: Accounting

James W. Clifton, M.Acc.
University of North Dakota, 1988
Field: Accounting

Thomas D. Dowdell, Ph.D.
Temple University, 2004
Field: Accounting

Karen Froelich, Ph.D.
University of Minnesota, 1994
Field: Strategic Management

Rajani Ganesh-Pillai, Ph.D.
University of Central Florida, 2009
Field: Marketing

David Herda, Ph.D.
University of Texas at Arlington, 2010
Field: Accounting

Yongtao "David" Hong, Ph.D.
Drexel University, 2008
Field: Accounting

Fariz Huseynov, Ph.D.
University of Memphis, 2009
Field: Finance

Ronald D. Johnson, D.B.A.
Indiana University, 1970
Field: Organizational Behavior

Joseph M. Jones, Ph.D.
University of Missouri-Columbia, 1991
Field: Marketing

Bonnie Klamm, Ph.D., CPA
Virginia Commonwealth University-Richmond, 1999
Field: Accounting Information System

Sukumarakurup Krishnakumar, Ph.D.
Virginia Polytechnic Institute, 2008
Field: Organizational Behavior

Michael Krush, Ph.D.
University of Nebraska – Lincoln, 2009
Field: Marketing

Derek Lehmberg, Ph.D.
University of Western Ontario, 2010
Field: Strategic Management

point average, high potential as measured by the GMAT score, and the financial needs of the student. Applications are available in the MBA director's office.

Degree Requirements

The total course requirements necessary to complete the MBA degree will vary depending on the background of the student. An adequate background in the functional areas of business is necessary for all students.

Foundation course areas include accounting, economics, statistics, management, marketing, and finance. Based on previous coursework, some or all of these courses may be waived.

Beyond the foundation course requirements, all students must complete 30 semester hours of graduate work. Graduate courses in the MBA Program include the following eight required 3-credit core courses: ACCT 720 – Strategic Cost Management, FIN 740 – Advanced Financial Analysis, MGMT 750 – Advanced Organizational Behavior, MGMT 751 – Advanced Operations Management, MRKT 760 – Strategic Marketing Management, MIS 770 – Information Resources Management, BUSN 780 – Business Conditions Analysis, BUSN 789 – Strategic Management, for a total of 24 semester hours. Students will take at least an additional six semester hours of approved elective courses.

Joint MBA-Pharm.D. Degree Program

The College of Business and the College of Pharmacy, Nursing and Allied Sciences offer a dual degree program where students receive a Pharm.D. degree and an MBA. Pharm.D. students meet the business foundation course requirement through the pharmacy curriculum, and the choice of MBA elective courses is flexible for students in the dual degree program. To be eligible for this joint degree program, students must apply to and be accepted into both the Pharm.D. and the MBA programs. The MBA course work can be completed in one year following completion of the Pharm.D. degree.

Jin Li, Ph.D.
University of Alberta, 2007
Field: Marketing

Gerry Macintosh, Ph.D.
University of Nebraska-Lincoln, 1992
Field: Sales and Sales Management

Joshua Marineau
University of Kentucky, Lexington, 2012
Field: Organizational Behavior

Michael J. Peterson, Ph.D.
The University of Iowa, 2002
Field: Accounting

Tim O. Peterson, Ph.D.
Texas A&M University at College Station, 1988
Field: Management/Organizational Behavior

Frederick Riggins, Ph.D.
Carnegie Mellon University, 1994
Field: Management Information Systems

Herbert Snyder, Ph.D.
Syracuse University, 1994
Field: Auditing, Forensic Accounting

Charles D. Stevens, Ph.D.
University of Kansas, 1998
Field: Human Resource Management

Joseph G. Szmerekovsky, Ph.D.
Case Western Reserve University, 2003
Field: Operations

Chanchai Tangpong, Ph.D.
University of Southern Illinois, 2002
Field: Strategic Management

Ruilin Tian, Ph.D.
Georgia State University, 2008
Field: Finance

Rodney D. Traub, Ph.D.
Purdue University, 1994
Field: Operations Management

Newell Wright, Ph.D.
Virginia Polytechnic Institute, 1993
Field: Marketing

Wei "David" Zhang, Ph.D.
Syracuse University, 2001
Field: Finance

Limin Zhang, Ph.D.
University of Arizona, 2005
Field: Management Information Systems

Jill Zuber, Ph.D.
University of Arkansas, 2007
Field: Accounting

Emeritus

C. Frederick Eisele, Ph.D.
University of Iowa, 1971
Field: Labor Management and Negotiation

Terry W. Knoepfle, J.D., CPA
University of North Dakota, 1981
Field: Business Law and Tax Accounting

Cellular and Molecular Pathology

Faculty

See page 62

Program and Application Information

Program Coordinator:	Dr. Mark Sheridan
Program Location:	Stevens Hall
E-mail Address:	ndsu.cmb@ndsu.edu
Telephone Number:	(701) 231-7087
Degree Offered:	Ph.D.
Application Deadline:	February 15 is the deadline for applicants seeking consideration of financial assistance (fellowship, assistantships) for fall semester and July 1 for spring semester.
Test Requirements:	GRE
English Proficiency Requirements:	TOEFL iBT 71 IELTS 6

Program Description

The CMB Program offers interdisciplinary research education and training opportunities that lead to a Ph.D. In this setting, students learn to integrate across concepts and to use multiple approaches to study contemporary biological problems. Students have access to state-of-the-art facilities and equipment in faculty laboratories and core facilities around campus. The CMB program prepares students for careers in academia and private industry. All graduates of the program have obtained permanent positions in their field or are engaged in postdoctoral training.

The CMB degree requirements include a series of required CMB core courses; additional elective courses; written and oral preliminary examinations; a doctoral dissertation based on independent, original research in the area of cellular and molecular biology under the direction of a CMB faculty member; and an oral defense of the dissertation.

CMB faculty members are recognized and respected nationally and internationally for contributions to their fields of study. They are drawn from 10 academic departments, including Animal Sciences, Chemistry and Molecular Biology, Biological Sciences, Cereal and Food Sciences, Entomology, Health, Nutrition, and Exercise Sciences, Pharmaceutical Sciences, Plant Pathology, Plant Sciences, and Veterinary and Microbiological Sciences. With the interdisciplinary nature of the program, you can look forward to working closely with not just one but many faculty members at NDSU.

Students may engage in basic and applied aspects of cellular and molecular biology research in various systems, including animals, plants, and microorganisms. Examples of current research by CMB faculty include the following:

- Adaptation to environmental stress
- Assistive reproductive technology
- Apoptosis
- Cancer
- Cell-cell communication
- Cell cycle regulation
- Cell metabolism
- Cytogenetics

- Drug action and metabolism
- Enzymology and metabolic regulation
- Extracellular matrix
- Gene regulation and expression
- Hormone biosynthesis, metabolism, and evolution
- Immunology
- Molecular pathogenesis
- Protein structure and function
- Signal transduction
- Stem cells and developmental processes

Admissions Requirements

The Cellular and Molecular Biology Ph.D. program is open to qualified graduates of universities and colleges of recognized standing. If possible, applicants should identify at least one cellular and molecular biology faculty member with whom they wish to study.

The following undergraduate courses have been identified as required for graduate work in the CMB program:

Biology: One year of general biology with laboratory and one course in genetics are required. Cellular biology or cellular physiology, animal or plant physiology, and microbiology are recommended.

Chemistry: One year of general chemistry with laboratory and two sequential terms of organic chemistry with laboratory are required. Biochemistry is recommended.

Mathematics: Two terms of life sciences calculus are required.

Physics: Two sequential terms of general physics with laboratories (above the concept level) are required.

In addition, introductory courses in computer science, statistics, and technical writing are recommended. Deficiencies in required courses may be made up within the first year of resident study without graduate credit.

Financial Assistance

Financial support, if required, is usually provided by the department in which the student will carry out research. In reviewing each application, the Steering Committee will contact the faculty member(s) identified by the applicant to determine if financial support is available. Students seeking financial support also can contact either the CMB faculty member(s) with whom they wish to study or the chair of the CMB Steering Committee.

Degree Requirements

By the end of the first academic year, the student will select an academic adviser from among the CMB faculty and arrange for the appointment of a Graduate Advisory Committee. This committee will consist of at least four members of the graduate faculty. This includes the student's major adviser, at least one additional CMB faculty member, and an appointee of the Graduate School. One committee member must be from outside the student's academic college.

The Plan of Study will be prepared by the student, in consultation with the major adviser, by the end of

the first year in residence. The plan shall be approved by the student's Graduate Advisory Committee, the CMB Program Director, the department chair, the academic dean, and the Graduate School dean. The Plan of Study must be filed in the Graduate School prior to scheduling the comprehensive written examination.

The Graduate School requires the Plan of Study for the Ph.D. degree to include not less than 90 semester graduate credits. Of this total, not less than 27 credits must be in courses other than seminar or research credits. Of the 27 course credits, 15 must be at the 700-789 level. The CMB program requires students to complete a series of 7 courses totaling 21-23 semester credits in 4 core areas. The student will complete additional elective courses to fulfill the Graduate School requirement of 27 semester credits in academic courses. An overall GPA of 3.0 or better must be maintained.

Courses Offered

1. Biochemistry and Molecular Biology (all are required)
   BIOC 701, 702 Comprehensive Biochemistry I and II
   BIOC 673 Methods of Biochemical Research
2. Cellular Biology
   Bot/Zoo 720 Advanced Cell Biology, required
   BIOL 722 Current Topics in Cell and Molecular Biology, optional
3. Molecular Biology
   BIOC 674 Methods of Recombinant DNA Technology, required
   One of the following is required:
   BIOC 719 Molecular Biology of Gene Expression and Regulation
   MICRO 783 Advanced Bacterial Genetics and Phage
   PLSC 731 Plant Molecular Genetics
4. Technique Courses (one is required)
   Bot 680 Plant Tissue Culture
   PPTH 756 Techniques in Electron Microscopy
   PLSC 684 Plant Tissue Culture and Micropropagation
   MICRO 645 Animal Cell Culture Techniques

The core courses will normally be completed by the end of the second year in residence. These courses must be completed before the student takes the preliminary written examinations, whereas the elective courses may be taken at any time during the program prior to defense of the dissertation. The elective courses will normally be classes offered by the department in which the student is doing research or other departments participating in the CMB program. Each student is expected to attend all CMB seminars and present at least one seminar per year throughout the program.

Examination

Written Preliminary Examination covers the first three core areas (biochemistry and molecular biology, cellular biology, and molecular biology) and is normally taken at the end of the second year in residence. The written preliminary examination must be passed before the comprehensive oral examination can be scheduled.

Comprehensive Oral Examination shall be taken no later than the end of the third year in residence. This examination will be based on a non-dissertation research topic that will be submitted in the format of a National Institutes of Health or National Science Foundation postdoctoral fellowship research proposal. After successful completion of the comprehensive oral examination, the student will be formally admitted to candidacy for the Doctor of Philosophy degree. At least one academic semester, and preferably two semesters, shall elapse between the preliminary oral examination and the oral defense of the research-based dissertation.

Dissertation Research

A short proposal describing research suitable for preparation of a dissertation in Cellular and Molecular Biology shall be prepared and submitted to the student's Graduate Advisory Committee and the CMB Steering Committee for review and approval. The dissertation must show originality and demonstrate the student's capacity for independent research. It must embody results of research that constitutes a definitive contribution to knowledge.

In addition to the defense of the dissertation in the final oral examination, the candidate will present a final public seminar based on the dissertation research.

Program Administration

This interdisciplinary graduate program is administered by the CMB Steering Committee. The committee is composed of five CMB faculty members representing five different academic departments. Steering Committee members, who serve overlapping three-year terms, are elected at a yearly meeting of the CMB faculty. A committee chair/program director is elected annually by the committee.

The duties of the Steering Committee include 1) review of each CMB student's plan of study, proposed research topic, and general progress; 2) review of applications for membership in the CMB faculty; and 3) implementation of the CMB program by established procedures.

Faculty

Marc L. Bauer, Ph.D.
University of Kentucky, 1996
Field: Digestive Physiology, Nutrition
Department: Animal Sciences

Eugene S. Berry, Ph.D.
Northeastern University, 1983
Field: Animal Virology (ss(+) RNA Viruses), Genetic Variation, Mechanisms of Pathogenesis and Virulence
Department: Veterinary and Microbiological Sciences

Julia Bowsher, Ph.D.
Duke University, 2007
Field: Evolutionary Developmental Biology; Molecular Basis of Pattern Formation
Department: Biological Sciences

Lynn S. Dahleen, Ph.D.
University of Minnesota, 1989
Field: Plant Molecular Genetics and Mapping, Tissue Culture, Transformation
Department: USDA, Plant Sciences

Glenn Dorsam, Ph.D.
Virginia Commonwealth University, 1998
Field: Epigenetic Regulation
Department: Chemistry and Biochemistry

Jeffery E. Gerst, Ph.D.
University of Nebraska, 1973
Field: Animal Physiology and Neurophysiology/Neuroendocrinology
Department: Biological Sciences

Anna T. Grazul-Bilska, Ph.D.
University of Agriculture and Technology, 1983
Field: Animal Embryology and Reproductive Physiology & Endocrinology, Assisted Reproduction Technology
Department: Animal and Range Sciences

Kendra Greenlee, Ph.D.
Arizona State University, 2004
Field: Insect Physiology and Immunology, Body Size Effects on Respiration and Metabolism
Department: Biological Sciences

Bin Guo, Ph.D.
State University of New York at Buffalo, 1999
Field: Cancer Cell Biology, Apoptosis, Molecular Pharmacology
Department: Pharmaceutical Sciences

Carrie Hammer, DVM, Ph.D.
Iowa State University, 2003
Field: Equine Physiology, Neonatal Physiology and Immunology
Department: Animal Sciences

Stuart Haring, Ph.D.
University of Iowa, 2004
Field: DNA Metabolism and Cell Cycle Regulation
Department: Chemistry and Biochemistry

Shahryar Kianian, Ph.D.
University of California-Davis, 1990
Field: Plant Genetics and Genomics; Germplasm Enhancement
Department: Plant Sciences

Benedict Law, Ph.D.
University of Manchester, 2002
Field: Imaging Diagnostics; Peptide/ Protein Delivery
Department: Pharmaceutical Sciences

Kasey Maddock-Carlin, Ph.D.
Iowa State University, 2005
Field: Meat Science and Muscle Biology
Department: Animal Sciences

Sanku Mallik, Ph.D.
Case Western Reserve University, 1992
Field: Bio-Organic Chemistry, Drug Delivery Using Liposomes and Nanoparticles
Department: Pharmaceutical Sciences

Phillip E. McClean, Ph.D.
Colorado State University, 1982
Field: Plant Molecular Genetics
Department: Plant Sciences

John McEvoy, Ph.D.
University of Ulster, 2002
Field: Molecular Epidemiology and Mechanisms of Invasion
Department: Veterinary and Microbiological Sciences

Steven W. Meinhardt, Ph.D.
University of Illinois at Urbana-Champaign, 1984
Field: Biochemistry of Plant Interactions, Purification Characterization, and Mode of Action of Fungal Toxins
Department: Plant Pathology

Stephen O'Rourke, Ph.D.
University of Wisconsin, 1995
Field: Vascular Pharmacology/ physiology, Regulation of Vasomotor Tone, Smooth Muscle-Endothelial Cell Interactions
Department: Pharmaceutical Sciences

Chung S. Park, Ph.D.
Virginia Polytechnic Institute and State University, 1975
Field: Maternal Nutrition and Epigenetic Control of Mammary Developmental and Mammary Cancer
Department: Animal Sciences

Birgit Pruess, Ph.D.
Ruhr-Universitat Bochum, 1991
Field: Bacterial Physiology and Global Gene Expression
Department: Veterinary and Microbiological Sciences

Steven Qian, Ph.D.
University of Iowa, 1999
Field: Free Radical Metabolism
Department: Pharmaceutical Sciences

Jack B. Rasmussen, Ph.D.
Michigan State University, 1987
Field: Fungal Disease Interactions, Mode of Action and Role in Disease of Pathogen-Produced Toxins
Department: Plant Pathology

Dale A. Redmer, Ph.D.
University of Missouri - Columbia, 1983
Field: Animal Physiology, Reproductive Physiology, Fetal Growth, Placental Function, Ovarian Function, Vascular Growth
Department: Animal Sciences

Katie Reindl, Ph.D.
North Dakota State University, 2006
Field: Cancer Cell Biology, Cell Migration and Metastasis, Cell Cycle Control, Extracellular Matrix Interactions
Department: Biological Sciences

Lawrence P. Reynolds, Ph.D.
Iowa State University, 1983
Field: Factors Influencing Fetal and Placental Growth and Development in Compromised Pregnancies
Department: Animal Sciences & Center for Nutrition and Pregnancy

Jane Schuh, Ph.D.
North Dakota State University, 2002
Field: Immunology of Chronic Airway Remodeling, Cellular Differentiation in Pulmonary Disease, Animal Modeling of Allergic Airway Disease (Asthma)
Department: Veterinary and Microbiological Sciences

Mark A. Sheridan, Ph.D.
University of California-Berkeley, 1985
Field: Control of Growth, Development, and Metabolism
Department: Biological Sciences

Jagdish Singh, Ph.D.
Banaras Hindu University, 1982
Field: Novel Drug Delivery Systems for Protein, Vaccine and Gene
Department: Pharmaceutical Sciences

Sangita Sinha, Ph.D.
Purdue University, 2000
Field: Structure Biology and Biochemistry of host pathogen interactions
Department: Chemistry and Biochemistry

D. K. Srivastava, Ph.D.
Banaras Hindu University, India, 1980
Field: Enzyme Mechanisms and Regulation
Department: Chemistry and Biochemistry

Chengwen Sun, Ph.D.
Jilin University, China, 2000
Field: Blood Pressure Regulation; Cell Signaling
Department: Pharmaceutical Sciences

Kimberly Vonnahme, Ph.D.
University of Wyoming, 2003
Field: Reproductive Physiology, Fetal and Placental Growth
Department: Animal Sciences; Center for Nutrition and Pregnancy

Erxi Wu, Ph.D.
Sheffield University, UK, 1998
Field: Pharmacogenomics; Tumor Therapeutic Targets; Drug Discovery; Anticancer Natural Products
Department: Pharmaceutical Sciences

Adjunct

Michael Edwards, Ph.D.
Cornell University, 1983
Field: Molecular Plant Virology
Department: Plant Pathology

Cereal Science

Program and Application Information

Acting Department Chair:	Dr. Jane Schuh
Department Location:	Harris Hall
Telephone Number:	(701) 231-7713
Degrees Offered:	Ph.D., M.S.
Application Deadline:	March 15 for entry in summer or fall semesters and September 30 for entry in spring semester.
English Proficiency Requirements	TOEFL iBT 71 IELTS 6

Program Description

The School of Food Systems offers graduate study leading to the M.S. and Ph.D. degrees in Cereal Sciences. Advanced work may involve research in the areas of proteins, carbohydrates, enzymes, and lipids of cereals, legumes, and other northern-grown crops; barley malting and brewing; wheat milling, baking, and pasta processing. Research in functional foods and stability of bioactive compounds in food systems are also predominant areas of research.

The department has a close working relationship with the Northern Crops Institute and the USDA Hard Red Spring and Durum Wheat Quality Laboratory housed in the Harris Hall complex.

Students are strongly urged to visit faculty members to discuss research opportunities. During the first year in the program, the student will, with his or her adviser, prepare a research proposal.

Admissions Requirements

The Cereal Sciences graduate program is open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full standing status to the program, the applicant must meet the Graduate School requirements found on page 5 and have adequate preparation in biochemistry/chemistry and the biological sciences, including microbiology.

Financial Assistance

The number of assistantships varies from year to year, depending on industrial support, grants, and the number of students in residence. Applicants are considered on the basis of scholarship, academic performance, and financial need. The application to the Graduate School, including the three letters of reference and official transcripts, is required to be considered for an assistantship. International students must also submit a TOEFL score. The minimum annual stipends for M.S. and Ph.D. students are

Faculty

Douglas C. Doehlert, Ph.D. (associate)
University of Wisconsin, 1982
Research Interests: Oat Variety Development, Quality of Oats and Oat Products

Clifford A. Hall III, Ph.D.
University of Nebraska-Lincoln, 1996
Research Interests: Flaxseed, Antioxidants, Phytochemical Stability in Food Systems

Frank Manthey, Ph.D.
North Dakota State University, 1985
Research Interests: Durum Wheat Quality, Pasta/Noodle Processing, Carotenoid Deposition in durum wheat

Deland Myers, Ph.D.
Iowa State University, 1984
Research Interests: Utilization of Legume and Cereal Proteins in Nonfood and Food Applications and Their Functionality.

Jae Ohm, Ph.D. (associate)
Kansas State University, 1996
Research Interests: Cereal Chemistry

Paul B. Schwarz, Ph.D.
North Dakota State University, 1987
Research Interests: Malting Barley Quality

Senay Simsek, Ph.D.
Purdue University, 2006
Research Interests: Wheat Quality and Carbohydrate Research

Dilrukshi Thavarajah, Ph.D.
University of Saskatchewan, 2006
Research Interests: Biofortification of Pulse Crops for Increased Micronutrient Bioavailability: Iron, Zinc, Beta Carotene, and Folic Acid

Pushparajah Thavarajah, Ph.D.
University of Saskatchewan, 2004
Research Interests: Food Nutrient-Nutrient Interactions, Bioavailability Chemistry of Carbohydrates, Phenolics, and Bioactive Compounds, and Analytical Method Development for Novel Bioactive Compound Analysis

$12,000 and $13,200, respectively, for a half-time assistantship. Assistantship stipends may be increased as the student progresses through their program after achieving milestones such as proposal defense, preliminary exam completion, etc.) In addition, graduate tuition is waived for students with assistantships.

Dennis P. Wiesenborn, Ph.D.
Rice University, 1988
Research Interests: Food Engineering, Process Development, Oilseeds Processing

Charlene Wolf-Hall, Ph.D.
University of Nebraska-Lincoln, 1995
Research Interests: Food Microbiology and Food Safety

Degree Requirements

The Master of Science program requires a minimum of 20 semester credits of course work with an overall GPA of 3.0 or better. The Ph.D. program requires the completion of a minimum of 40 semester credits of course work with an overall GPA of 3.0 or better.

With assistance from the adviser, a supervisory/advisory and examining committee is established and a plan of study developed. The student is required to prepare and defend a written research proposal.

For M.S. candidates, a written examination on course work is required prior to scheduling the final oral examination at which the student defends the thesis and is asked questions covering academic subject matter.

Ph.D. candidates are required to take a preliminary written and oral examination covering academic subject matter and a final oral defense of a research-based dissertation.

Research Facilities and Equipment

The department maintains specialized equipment that evaluates cereal and food quality including laboratory equipment, such as spectrophotometers, gas chromatographs, a particle size analyzer, LC-MS, GC-MS, high-performance liquid chromatographs, various electrophoretic devices, a differential scanning calorimeter, Rapid ViscoAnalyzer, and computer terminals. Flour mills, ranging up to pilot-plant size; two completely equipped bake shops; continuous bread-baking equipment; rheological instruments for dough testing; several pasta-processing units; malting equipment; Asian noodle making equipment; soymilk/tofu processing machines; a wet processing pilot plant; labscale HT/ST extruder; and a microbrewery are some examples of the specialized equipment.

In addition, the department has access to equipment and instrumentation in the Northern Crops Institute and USDA Hard Red Spring and Durum Wheat Quality Laboratory housed in the same building complex.

Chemistry

Program and Application Information

Department Chair:	Dr. Greg Cook
Department Location:	Ladd Hall
E-mail Address:	NDSU.chemistry@ndsu.edu
Telephone Number:	(701) 231-8694
Degrees Offered:	Ph.D., M.S.
Application Deadline:	March 1 for fall, September 1 for spring
Test Requirements:	GRE (general required; subject recommended)
English Proficiency Requirements	TOEFL ibT 81 (23 speak; 21 write) –TA; 71 – RA IELTS 6.5 – TA; 5.5 – RA

Program Description

The Department of Chemistry and Biochemistry offers programs leading to the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degree in Chemistry. At the start of the first year of study, entering graduate students take entrance examinations in analytical, inorganic, organic, and physical chemistry , as well as chemistry and biochemistry. The graduate student progress committee uses these exams for advisory purposes in recommending course work during the first year. As a consequence, programs are individually tailored to the needs of each student. Typically, coursework is completed in one to one-and-a-half years for M.S. candidates, and two years for Ph.D. candidates, leaving later years for full-time thesis research. The typical time to complete a graduate degree averages three years for the M.S. degree and approximately five years for the Ph.D.

Admissions Requirements

The graduate programs in biochemistry are open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full standing to the program, the applicant must meet the Graduate School's requirements found on page 5 and have adequate preparation for the study of chemistry at the graduate level, and show potential to undertake advanced study and research as evidenced by academic performance and experience.

Financial Assistance

The student must first apply to the Graduate School and be accepted in full or conditional status before he/she is eligible for an assistantship in the Department of Chemistry and Biochemistry.

Faculty

Uwe Burghaus, Ph.D.
Free University of Berlin, 1995; Postdoctoral, University of Genoa, Italy, 1995-1997
Research Area: Surface Physical Chemistry

Gregory R. Cook, Ph.D.
Michigan State University, 1993; Postdoctoral, Stanford University, 1994-1996
Research Area:Synthetic Organic Chemistry

John F. Hershberger, Ph.D.
Yale University, 1986; Postdoctoral, Columbia University, 1986-1989
Research Area: Experimental Physical Chemistry, Laser Kinetics

Denley Jacobson, Ph.D.
Purdue University, 1984; Postdoctoral, California Institute of Technology, 1984-1986
Research Area: Gas Phase Ion Chemistry

Sivaguru Jayaraman, Ph.D.
Tulane University, 2003; Postdoctoral, Columbia University, 2003-2006
Research Area: Supramolecular Chemistry, Molecular Recognition, and Photoscience

M. Erkan Kose, Ph.D.
University of Florida, 2005; Postdoctoral, Clemson University, 2005-2006; National Renewable Energy Laboratory, 2006-2009
Research Area: Materials Chemistry and Photochemistry

Guodong Liu , Ph.D.
Hunan University, 2001; Postdoctoral, New Mexico State University, 2002-2004; Postdoctoral, Pacific Northwest National Laboratory, 2004-2006
Research Area: Nanotechnology and Biological Sensing

Seth C. Rasmussen, Ph.D.
Clemson University, 1994; Postdoctoral, University of Oregon, 1995-1999
Research Area: Inorganic/Organic Materials Chemistry, Chemical History

Kenton R. Rodgers, Ph.D.
University of Iowa, 1988; Postdoctoral, Princeton University, 1989-1993
Research Area:
Inorganic and Bioinorganic Chemistry

Graduate students in the Department of Chemistry and Biochemistry are supported during both the academic year and during summer months by either teaching assistantships (TA) or research assistantships (RA). As of the 2009-2010 academic year, the standard monthly stipend is $1,683 per month for RAs and $1,750 per month for TAs. Graduate tuition (except for a student activity fee) is waived for all TAs and RAs in good academic standing.

Mukund P. Sibi, Ph.D.
City University of New York, 1980; Postdoctoral, Dartmouth College, 1980 -1982; Postdoctoral, University of Waterloo, 1982-1985
Research Area: Synthetic Organic Chemistry; Natural Products

Wenfang Sun, Ph.D.
Institute of Photographic Chemistry, Chinese Academy of Sciences, 1995; Postdoctoral, University of Alabama, Birmingham, 1997-1999
Research Area: Organic Materials Chemistry

Pinjing Zhao, Ph.D.
Cornell University, 2003; Postdoctoral, Yale University, 2004-2006; Postdoctoral, University of Illinois at Urbana-Champaign, 2006-2007
Research Area: Inorganic and Organometallic Chemistry

Degree Requirements

The Master of Science program requires the completion of a total of 30 graduate semester credits with an overall GPA of 3.0 or better. This total is comprised of both class work and research credit, but must consist of at least 16 semester credits from letter-graded course work. The Ph.D. program requires the completion of a total of 90 graduate semester credits with an overall GPA of 3.0 or better. This total is comprised of both class work and research credit, but must consist of at least 27 semester credits from letter-graded course work.
Each student chooses a thesis adviser within six months of beginning graduate school. As this is one of the most important decisions made in graduate school, students are strongly urged to visit multiple faculty members to discuss research opportunities. In addition, faculty seminars during the fall semester are designed to acquaint new students with the available research programs.

By the end of the first academic year, each student selects an advisory and examination committee, which consists of the thesis adviser, two other faculty members in the chemistry department, and one faculty member from a department outside the Department of Chemistry and Biochemistry.

Admission to candidacy for the Ph.D. degree is accomplished by satisfying three requirements: 1) satisfactory performance in course work with a minimum 3.0 grade-point average, 2) satisfactory performance in comprehensive examinations taken by the end of the 4th semester, and 3) satisfactory defense of an original research proposal on a topic approved by the student's advisory committee. The defense of this proposal must occur at least eight months prior to the final oral examination. Following completion of dissertation research, the candidate must complete a written dissertation and an oral presentation to the department and advisory committee.

Research Opportunities and Infrastructure

The Department of Chemistry and Biochemistry has more than 10 externally funded faculty research programs. Research expenditures have averaged $1.8 million over the last 10 years, with more than $2.2 million in the last 2 years.

All research and most teaching activities within the department occur within three centrally-located buildings, including two connected facilities, Ladd Hall and Dunbar Laboratory, as well as the Industrial and Agricultural Communications Center (IACC) located across the street. Most departmental offices, classrooms and teaching labs as well as some research labs are located in Ladd Hall, while Dunbar and the third floor of the IACC primarily consists of research laboratories. Ladd Hall also houses departmental glass, machine, and electronics shops.
Modern instrumentation is vital to research in the chemical sciences. The quality and quantity of instrumentation within the department has been greatly enhanced in the last few years through aggressive fund-raising efforts and university matching support.

The department has recently upgraded its mass spectrometry capabilities to include a Bio-TOF III with accurate mass analysis, ESI and CI ionization; as well as an Esquire 3000 Plus - an Ion trap instrument with MS-MS and proteomics capabilities. A dedicated LC can be integrated with the both the instruments.

The Organic Spectroscopy Laboratory is primarily devoted to maintenance and operation of Nuclear Magnetic Resonance (NMR) spectrometers. The facility includes three modern high-field instruments: Varian 500, 400, and 300 MHz spectrometers. All have multinuclear, 2-D, and variable temperature capabilities, and the 400 MHz instrument has been recently upgraded for solids capabilities. This center also includes the departmental FTIR.

The Materials Characterization Laboratory houses the departmental crystallography faculties including a Bruker single crystal CCD X-ray diffractometer with low temperature capabilities, a Philips MPD (Multi-Purpose Diffractometer), two Philips X-ray powder diffractometers, and a Kevex X-ray fluorescence unit. CHN Elemental analysis, thermogravimetric analysis (TGA), differential scanning calorimetry (DSC), and differential thermal analysis (DTA) are also available.

The Center for Protease Research - Core Biology Facility is a new facility housing equipment and technical personnel for performing bioassay, cell and tissue culture, and molecular biology experiments. For bioassays, the facility has a fluorimeter capable of top or bottom reading and the capability to handle both 96- and 384-well plates. For sample preparation, researchers can utilize cell and tissue culture capabilities such as flow hoods and culture chambers. In addition, RT-PCR and FPLC protein purification technology is available.

The chemistry library, located in Ladd Hall, provides graduate students and faculty with convenient 24-hour access to more than 200 journals and approximately 10,000 volumes. Literature searching via SciFinder is supported.

Prospective students are encouraged to visit the Department of Chemistry and Biochemistry Web site (http://www.ndsu.edu/chemistry/) for the latest descriptions of research programs and instrumentation.

Civil Engineering

Program and Application Information

Department Chair:	Dr. Eakalak Khan
Department Location:	201 Civil and Industrial Engineering Bldg.
Telephone Number:	(701) 231-7244
Degrees Offered:	Ph.D., M.S.
Application Deadline:	Feb 15 for Fall admissions and Sept 15 for Spring admissions
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

The Department of Civil Engineering offers the M.S. and Ph.D. degrees in civil engineering and the M.S. degree in environmental engineering. Also, the College of Engineering and Architecture offers a program leading to a Ph.D. degree in engineering in which civil engineering is a possible area of specialization. The M.S. in environmental engineering and the Ph.D. in engineering programs are described in their respective sections. The department also participates in several interdisciplinary programs such as Environmental and Conservation Sciences, Materials & Nanotechnology and Transportation and Logistics.

Specialty areas in the M.S. and Ph.D. degrees in civil engineering include construction, environmental, geotechnical, materials, structural, transportation, and water resources engineering. Other related areas are also accommodated. The academic and research foci are tailored to individual needs and interests. To complement the major area of study, additional courses are often selected from other disciplines. The programs are designed to advance the technical knowledge, competence, and interdisciplinary understanding of the students and to prepare them for entering or advancing within the civil engineering profession.

Admissions Requirements

Application to the Civil Engineering program is open to qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements listed on page 5, the applicant must have adequate preparation in civil engineering. A master's degree in civil engineering is preferred for applicants to the Ph.D. program.

Financial Assistance

Research and/or teaching assistantships may be available. Appli-

Faculty

Magdy Abdelrahman, Ph.D.
University of Illinois-Urbana, 1996
Research Interests: Characterization of Modified Asphalt Binders and Mixes, Pavement, Maintenance and Rehabilitation Techniques, Performance-Related, Specifications for Pavement Materials, Quality Control and Quality, Assurance in Pavement Construction.

Donald A. Andersen, Eng.D.
Texas A & M University, 1982
Research Interests: Transportation, Pavements, Traffic Engineering

Achintya N. Bezbaruah, Ph.D.
University of Nebraska-Lincoln, 2002
Research Interests: Environmental sensors, Recalcitrant and micro pollutants, Contaminant fate and transport, Small community water and wastewater treatment, Environmental management

Xuefeng (Michael) Chu, Ph. D.
University of California, Davis, 2002
Research Interests: Watershed Hydrologic and Environmental Modeling, Overland Flow and Infiltration, Integrated Modeling of Flow and Contaminant Transport

S. Gajan, Ph.D.
University of California, Davis, 2006
Research Interests: Geotechnical Engineering, Earthquake Engineering, Dynamic Soil - Structure Interaction

Dinesh Katti, Ph.D.
University of Arizona, 1991
Research Interests: Geotechnical Engineering, Constitutive Modeling of Geologic Materials, Expansive Soils, Multiscale Modeling, Steered Molecular Dynamics, Computational Mechanics, Nanocomposite, and Bio-nanocomposites. Computational Biophysics

Kalpana Katti, Ph.D.
(Graduate Coordinator)
University of Washington, 1996
Research Interests: Advanced Composites, Nanomaterials, Biomaterials, Biomimetics, Materials Characterization and Modeling, Analytical Electron Microscopy, and Microspectroscopy, Bone Tissue engineering

cants are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. To be considered for an assistantship, a completed Graduate School application, official transcripts, and three letters of reference (and TOEFL results for international applicants) must be submitted to the Graduate School.

For teaching assistantships, TOEFL and additional requirements for eligibility can be found on the Graduate School webpage.

Degree Requirements

The Master of Science degree is offered in the thesis format. This format emphasizes research, and the ability to analyze and interpret data and to prepare a scholarly thesis. The student and adviser develop a program of study consisting of at least 30 credit hours of graduate level material to meet individual educational goals. An overall GPA of 3.0 or better must be maintained. An oral defense of the research-based thesis is required.

The Doctor of Philosophy degree requires a total of 90 credits beyond the baccalaureate degree in civil engineering with an overall GPA of 3.0 or higher (60 credits beyond an M.S. degree in Civil Engineering or a sub-area of Civil Engineering) for graduation. A dissertation advisory committee should be formed and a plan of study filed by the end of first year after admission. A minimum of 30 hours of additional course work chosen by the student and his/her advisory committee from appropriate existing Civil Engineering graduate courses, new courses, and courses outside the department must be completed.

An M.S. degree from another institution may substitute for up to 30 credits of the 90 credits required; however, suitability of transfer or use of courses and research credits in the plan of study would be decided by the adviser and advisory committee.

A comprehensive preliminary exam is administered after completion of the greater portion of the course work. The committee chair will coordinate the examination. The format and duration will be determined by the committee. The student will present a research proposal within one year after the preliminary examination. A minimum of 30 and a maximum of 40 credit hours can be earned for research, preparation, and defense of a dissertation in Civil Engineering. A minimum of 12 credit hours in a minor or cognate area as deemed appropriate by the student and the advisory committee may be completed by the student. The student will defend his/her dissertation in a final examination attended by the advisory committee members and other academics.

Eakalak Khan, Ph.D.
University of California, Los Angeles, 1997
Research Interests: Water and Wastewater Quality, Water and Wastewater Treatment, and Storm Water and Non-point Source Pollution

Wei Lin, Ph.D.
SUNY at Buffalo, 1992
Research Interests: Water and Wastewater Treatment, Hazardous Waste Management

G. Padmanabhan, Ph.D.
Purdue University, 1980
Research Interests: Stochastic Hydrology, Water Resource Systems, and Hydrologic Modeling

Gary R. Smith, Ph.D.
Purdue University, 1986
Research Interests: Quality Control and Systems Applications, Decision Analysis and Modeling Techniques, Safety Performance Measurement and Improvements in Labor Productivity

Amiy Varma, Ph.D.
Purdue University, 1993
Research Interests: Transportation Systems and Planning, Traffic Engineering, Airports, and Infrastructure Management

Mijia Yang, Ph.D., P.E.
University of Akron, 2006,
China University of Mining and Technology, 1999
Research Interests: Advanced Materials, Structural Assessment, Solid Mechanics

Frank Yazdani, Ph.D.
University of New Mexico, 1987
Research Interests: Structures, Constitutive Modeling of Materials, and Continuum Mechanics

Adjunct

Denver D. Tolliver, Ph.D.
Virginia Polytechnic University, 1989
Research Interests: Transportation, Planning and Economics

Robert Zimmerman, Ph.D.
North Dakota State University, 1991
Research Interests: Water and Wastewater Treatment, Solid Waste

Coatings and Polymeric Materials

Program and Application Information

Department Chair:	Dr. Dean Webster
Department Location:	Research I, Research Park
Email:	Dean.Webster@ndsu.edu
Telephone Number:	(701) 231-7633
Degrees Offered:	Ph.D., M.S.
Application Deadline:	April 15th for Fall Semester; Applications are reviewed for all semesters, however fall start is preferred.
Test Requirements:	GRE (required for international applicants, recommended for all applicants)
English Proficiency Requirements:	TOEFL ibT 79 IELTS 6

Program Description

The Department of Coatings and Polymeric Materials offers graduate studies leading to the M.S. and Ph.D. degrees in polymers and coatings science and students in the department may also get a Ph.D. in the Materials Science and Nanotechnology program. The departmental research bridges between basic and applied research in the field of polymers and coatings. There is an unique atmosphere and opportunities for cross-disciplinary research experience, often accomplished by multi-disciplinary research activities with, for example, chemistry or engineering departments. Advanced research work involves specialized training in the following areas: colloidal and interfacial chemistry of polymers and coatings, polymer synthesis, adhesion, durability, spectroscopy, corrosion, electrochemistry, nanomaterials design and synthesis, and rheology. The department has an industrial advisory board consisting of leading industrial scientists and/or former graduates who provide new directions and other feedback to the program.

First-year students who enter the program may take entrance examinations, which are used by the graduate committee primarily for advisory purposes. During the fall semester, the faculty meet with the new students to acquaint them with the research programs in the department. Because students are required to team with a research adviser by the end of the first semester in residence, they are required to discuss research opportunities with all faculty members.

Faculty

Gordon P. Bierwagen, Ph.D.
Iowa State University, 1968
Research Interests: Surface chemistry of coatings materials, corrosion protection by coatings, electrochemical characterization of coatings and polymers, coating lifetime prediction, concentrated random composites

Stuart G. Croll, Ph.D.
University of Leeds, 1974
Research Interests: Weathering durability of coatings, service lifetime prediction, colloidal stability, molecular modeling, pigment-polymer interactions, film formation processes, coating physics, art conservation.

Erik Hobbie, Ph.D.
University of Minnesota, 1990
Research Interests: Nanotechology, Nanoparticles Polymers, Optics and Rheology

Victoria Johnston Gelling, Ph.D.
North Dakota State University, 2001
Research Interests: Corrosion control of active metal substrates by environmentally friendly coatings, electroactive conducting polymers (ECPs) as corrosion inhibitors, electrochemical experimental techniques for the examination of coated substrates

Andriy Voronov, Ph.D.
Lviv Polytechnic National University, 1994
Research Interests: Synthesis of polymers for stimuli-responsive materials, including micellar assemblies, nanoparticles, functional capsules, colloidosomes. Responsive amphiphilic macromolecules for biomedical applications, including drug delivery.

Dean Webster, Ph.D.
Virginia Polytechnic Institute and State University, 1984
Research Interests: Synthesis of high performance polymers, polymerization reactions, crosslinking chemistry, and quantitative structure-property relationship

Admissions Requirements

The Department of Coatings and Polymeric Materials graduate program is open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full standing status to the

program, the applicant must meet the Graduate School requirements found on page 5 and have adequate preparation in a science or engineering field.

Financial Assistance

The student must first be accepted in full or conditional status before he/she is eligible for an assistantship in the Department of Coatings and Polymeric Materials. To be considered for an assistantship, a completed Graduate School application, official transcripts, and three letters of reference must be submitted no later than April 15. International students must also submit a TOEFL score. General and subject GRE scores are highly encouraged if they are available to the student. Graduate students may be supported during both the academic year and summer months by either teaching or research assistantships. The current monthly stipend is $1,750+ per month, for an annual stipend of $21,000+. University tuition is waived for qualified TA's and RA's.

Degree Requirements

The Master of Science program requires the completion of 16 credits of letter-graded course work with an overall GPA of 3.0 or better. The Ph.D. program requires the completion of 27 credits of letter-graded course work with an overall GPA of 3.0 or better. Each student must choose a thesis (research) adviser within three to six months of beginning graduate school. After two semesters, the student must also select an examining committee. This committee advises the student and administers oral examinations. Candidates for the M.S. program normally satisfy course requirements within one year of study. Ph.D. candidates typically take about two years to complete courses, leaving later years for full-time dissertation research.

Candidacy qualifying examinations are administered twice annually. All Ph.D. candidates are required to pass the qualifying exam and defend an original written research proposal at least eight months prior to the final dissertation examination. The proposal topic must be approved by the student's research advisor and the committee administers an oral exam. Lastly, following completion of dissertation research and the presentation of an acceptable written dissertation, the candidate defends it before the advisory committee.

Research Facilities and Equipment

The Department of Coatings and Polymeric Materials is housed in a new building in the NDSU Research and Technology Park on the northwest corner of the campus. This building consists of nearly 40,000 square feet of space for research and teaching. The holdings in the Klosterman Chemistry Library (second floor of Ladd Hall) include current subscriptions to more than 200 journals, monographs, and other reference materials. Graduate students and faculty have round-the-clock access seven days a week.

Research Faculty

Dennis E. Tallman
(formerly of NDSU Dept. of Chemistry)
The Ohio State University, 1968
Research Interests: Analytical and Physical Electrochemistry, Corrosion Mechanisms, Corrosion Control by Coatings, Electroactive Conducting Polymers, Scanning Probe Techniques Microelectrodes and Microelectrode Arrays

Adjunct Faculty

Dante Battocchi, Ph.D.
(Center for Surface Protection, NDSU)
University of Trento, 2001
North Dakota State University, 2012
Research Interests: Electrochemical Noise Measurements, Scanning Vibrating Electrode Technique (SVET), Organic metal-rich primers characterization and development, Materials protection and metal corrosion

Bret Chisholm, (CNSE, NDSU)
University of Southern Mississippi, 1993
Research Interests: Combinatorial chemistry methods for coatings, novel organic-inorganic coatings applications, new polyester nanocomposites

Matthew S. Gebhard (DSM)
Stanford University, 1990
Research Interests: Rheology in coatings processes, final film properties, architectural binder technology

Loren W. Hill, Ph.D. (Consultant)
Pennsylvania State University, 1965
Research Interests: Structure-property relationships of thermoset coatings, dynamic mechanical analysis

Theodore Provder, Ph.D. (Consultant)
University of Wisconsin, 1965
Research Interests: Chromatographic and separation methods of polymers, particle size measurements

Richard R. Roesler, Ph.D. (Consultant)
University of Washington, 1969
Research Interests: Blocked polyisocyanates, polyurethane pispersions, high solids amine functional coreactants for polyisocyanate

Brian S. Skerry, Ph.D.
(Sherwin-Williams)
University of Manchester, 1980
Research Interests: Corrosion and coatings

Modern equipment and instrumentation have profoundly influenced the development of instruction and are the cornerstones of research in the chemical sciences. The Department of Coatings and Polymeric Materials possesses extensive instrumentation to characterize polymers and colloids ranging from the most modern spectrometers, advanced electrochemical equipment to study corrosion and atomic force microscopes , as well as paint making and testing equipment Other modern research facilities, for example, state-of-the-art electron microscopy, high-performance computing and NMR laboratories, are readily available to all researchers on the NDSU campus and in the NDSU technology park.

Communication

Program and Application Information

Department Chair:	Dr. Mark Meister
Graduate Coordinator:	Dr. Amy O'Connor
Department Location:	Minard Hall
Telephone Number:	(701) 231-7705
Degrees Offered:	Ph.D., M.A., M.S.
Application Deadline:	January 15 for Fall (Ph.D. only)
Test Requirements:	GRE (general required; subject recommended)
English Proficiency Requirements	TOEFL ibT 100 for admission 114 for teaching assistantship IELTS 7.5

Program Description

The graduate program in communication offers graduate study leading to the M.A., M.S., and Ph.D. degrees. The program prepares students for advanced graduate work, management-level positions, teaching or advancement within their current careers.

The department tailors student research projects and academic programs to individual needs and interests. Students may take interdisciplinary graduate course work to enhance their program of study. In addition, the M.A. and M.S. degrees are available through online delivery. Information also is available on the department's Web site, www.ndsu.edu/communication.

Admissions Requirements

Programs are open to students holding baccalaureate degrees from accredited universities or colleges.

Master of Science or Arts

To be admitted with full status to the program, the applicant must meet the Graduate School requirements found on page 5; have adequate study in communication, journalism or a related area; and provide a score for the Graduate Record Examination (GRE).

Doctor of Philosophy

To be admitted with full status to the program, the applicant must meet the Graduate School requirements found on page 5. In addition to materials required by the Graduate School applicants must: submit

- A CV or resume which clearly identifies your current position, including your responsibilities; your professional publications and papers; your service and professional activity; and your teaching and training experiences
- A professional writing sample, such as a master's thesis, a final

Faculty

Stephenson J. Beck, Ph.D.
University of Kansas, 2008
Research Interests: Group and Organizational Communication, Interaction Analysis, Communication Strategy

Ann Burnett, Ph.D.
University of Utah, 1986
Research Interests: Legal Communication, Small Group Communication, Interpersonal Communication, Gender and Communication

Ross F. Collins, Ph.D.
University of Cambridge, 1992
Research Interests: Media History, International Media

Elizabeth Crisp Crawford, Ph.D.
University of Tennessee, 2007
Research Interests: Visual Storytelling, Advertising Message Strategy, Advertising Education

Robert S. Littlefield, Ph.D.
University of Minnesota, 1983
Research Interests: Intercultural Communication, Risk and Crisis Communication, Forensic History and Pedagogy

Pamela Lutgen-Sandvik, Ph.D.
Arizona State University, 2005
Research interests: workplace bullying, organizational communication

Zoltan Majdik, Ph.D.
University of Southern California , 2008
Research Interests: Science and Risk Communication in Biotechnological Practice, Rhetorical and Argumentation Theory, Ethics and Moral Theory

Mark Meister, Ph.D.
University of Nebraska, 1997
Research Interests: Rhetorical and Critical Theory, Environmental Communication

Amy O'Connor, Ph.D.
Purdue University, 2004
Research Interests: Organizational Communication, Corporate Advocacy, Public Affairs and Issues Management

Charles Okigbo, Ph.D.
Southern Illinois University, 1982
Research Interests: Social and Behavioral Change Communication, Health Communication

paper for a course, a conference paper, a briefing paper or a news article
- Graduate Record Exam (GRE) scores. The department's typical combined GRE score is 300+ and 4.0+ writing.

Financial Assistance

Students admitted at full or conditional status may apply for teaching assistantships at the master's degree level or at the doctoral level. Teaching assistants teach two speech fundamentals classes or media writing classes each semester. Doctoral-level teaching assistants teach two classes each semester. Depending on experience, a portion of the assistantship may be devoted to assisting with other communication courses. Teaching assistantship deadline is Feb. 15 for the following fall semester.

Graduate assistants receive a stipend and tuition waiver. Applications are available from the department office or online from the department's Web site (www.ndsu.edu/communication). Other assistantships requiring specialized media knowledge may be available through other university offices.

Carrie Anne Platt, Ph.D.
University of Southern California, 2008
Research Interests: Rhetoric of Cultural Politics, Gender and Technology, Media in Society

Catherine Kingsley Westerman
Ph.D., Michigan State University
Research Interests: Organizational Communication, workplace friendships

David Westerman
Ph.D., Michigan State University
Research Interests: Computer mediated communication, interpersonal communication

Nan Yu, Ph.D.
Penn State University, 2009
Research Interests: Health Communication, International Communication

Emeritus

Paul E. Nelson, Ph.D.
University of Minnesota

Judy C. Pearson, Ph.D.
Indiana University

Degree Requirements

Master's program

The Master of Arts program is designed for students who are interested in conducting qualitative or rhetorical research, while the Master of Science program is designed for those interested in quantitative research. Both programs require completion of 30 credit hours of graduate coursework with an overall GPA of 3.0 or better. The student can elect to complete a research-based thesis, for which six of the 30 credits are awarded, or a written exam, for which three credits are awarded. A prospectus meeting and final defense of the thesis/written exam is required.

Core (6 credits)

COMM 700 - Research Methods in Communication
COMM 711 - Communication Theory

Teaching assistants are also required to take COMM 702 - Introduction to College Teaching in their first or second semester.

Research Tools (6 credits)

Students must take at least two of the following courses:

COMM 704 - Qualitative Research Methods in Communication
COMM 707 - Quantitative Research Methods in Communication
COMM 767 - Rhetorical Criticism
SOC 700 - Qualitative Research Methods
SOC 701 - Quantitative Research Methods
STAT 725 - Applied Statistics

Students pursuing the M.A. degree must take at least one qualitative methods course (COMM 704, COMM 708, COMM 767, or SOC 700). Students pursuing the M.S. degree must complete at least one quantitative methods course (COMM 707, COMM 710, SOC 701, or STAT 725).

Elective Specialization (12-15 credits)

12-15 credits of additional coursework, depending on whether the thesis or paper/project option is selected. Students can select from a wide range of specializations, pending approval from their advisor. Students may also choose graduate-level electives from other departments that may enhance specialized communication study goals.

Thesis or Paper/Project (3-6 credits) The paper/project option requires three credits of COMM 797. The thesis requires six credits of COMM 798.

Doctor of Philosophy

The Ph.D. program is designed to be completed in 4 years, and requires at least 60 credit hours beyond the master's degree. These hours will be in a planned course of study approved and overseen by the student's advisor and advisory committee.

The department currently offers two areas of concentration:

- Interpersonal Communication
- Organizational Communication
-

Students with a master's degree in another discipline may be required to complete additional graduate course work in specific areas of communication deemed necessary by the student's advisor and advisory committee. Graduate work taken beyond the master's degree may be judged applicable by the advisory committee, but post-master's graduate credits beyond 9 semester hours will not count toward the 60 credit minimum required for the Ph.D.

Students are strongly encouraged to take all of the Summer Scholars courses and are required to take at least two.

Course Requirements

Minimum of 30 credit hours in core or content concentration:

Core Courses (9 credits)

- COMM 701- Advanced Research Methods in Communication I
- COMM 703 - Advanced Research Methods in Communication II
- COMM 711 - Communication Theory

Teaching assistants, without adequate prior teaching experience, are also required to take COMM 702 - Introduction to College Teaching in their first or second semester.

Content Concentration (at least 21 credits)

- Minimum of 12 credit hours in the department's 700-level courses in the student's major concentration area
- Minimum of 3 credit hours in the department's 700-level courses in the student's minor concentration area
- Minimum of 6 credit hours at the 700-level in a cognate area outside the department

Research Courses (at least 15 credits)

- Minimum of 3 credit hours of research method courses
- Maximum of 6 credit hours of independent study

Dissertation (at least 15 credit hours)

Comprehensive Exams
When coursework is nearly completed, doctoral students will meet with their advisors to determine if they are prepared to complete the comprehensive examination. The advisor will consider the program of study, the student's professional presentations and publications, the student's teaching or other applied work, and the student's professional service.

When the advisor agrees, the student will complete the comprehensive examination. After completion of the examination, the doctoral committee will evaluate the written work. If the committee deems the work to be generally acceptable, the advisor will schedule an oral examination in which the student will defend his or her exam.

Computer Science

Program and Application Information

Department Head:	Dr. Brian Slator
Graduate Coordinator:	Dr. Kendall Nygard
Department Location:	258 IACC
Email:	Kendall.Nygard@ndsu.edu
Telephone Number:	(701) 231-8562
Degrees Offered:	Ph.D., M.S.
Application Deadline:	March 31 for fall, applications are also accepted for spring and summer.
Test Requirements:	GRE
English Proficiency Requirements	TOEFL ibT 79 IELTS 6

Program Description

The Department of Computer Science and Operations Research offers the M.S. and Ph.D. in Computer Science. Graduate course work in Operations Research is offered and may be used to provide an operations research concentration to either program. For additional information, please contact the department chair (701) 231-6124.

Admissions Requirements

The following minimum qualifications are required of all students seeking an advanced degree:

Master of Science

- The applicant must have a baccalaureate degree from an educational institution of recognized standing.
- The applicant must show, by a combination of educational background, academic performance, and work experience, the potential to succeed in advanced study and research in computer science. Minimum preparation usually includes the ability to program in one or more modern, commonly used high-level languages; at least one semester of calculus; and experience in using data structures such as linked lists and binary trees. Minimum preparation for unconditional admission to the master's program would normally include courses in computer science principles and theory equivalent to the NDSU courses CSci 160, 161, 222 or 335, 372, and 373.
- The applicant for the M.S. must have a cumulative grade point average (GPA) in all previous courses of at least 3.0 (out of 4.0) or equivalent to attain full standing.
- International students are welcome. They must submit a TOEFL

Faculty

Anne Denton, Ph.D.
University of Mainz, 1996
Research Interests: Data Mining, Bioinformatics, Scientific Informatics, Educational Technology, Model Building, Databases

Hyunsook Do, Ph.D.
University of Nebraska, 2007
Research Interests: Software Engineering, Software Testing, Maintenance, and Empirical Methodologies.

Wei Jin, Ph.D.
State University of New York at Buffalo, 2008
Research Interests: Data Mining and Knowledge Discovery (particularly text and web mining), Information Retrieval and Extraction, Machine Learning, and Bioinformatics

Dean Knudson , Ph.D.
Northwestern University, 1972
Research Interests: Software Development and Management

Jun Kong , Ph.D.
University of Texas, Dallas, 2005
Research Interests: Software Engineering; Human-Computer Interaction; Model Management

Juan (Jen) Li, Ph.D.
University of British Columbia, 2008
Research Interests: Distributed system: P2P and Grid Systems, Mobile Ad Hoc Network, Distributed Search, Routing Algorithms; Semantic Web Technologies; Information Retrieval and Knowledge Discovery; Green Computing

Kenneth Magel, Ph.D.
Brown University, 1977
Research Interests: Software Engineering, Human-Computer Interfaces, Computer Networks, Subsymbolic Computation

John Martin, Ph.D.
Rice University, 1971
Research Interests: Theoretical Computer Science, Theory of Computation

Kendall Nygard, Ph.D.
Virginia Polytechnic Institute and State University, 1978
Research Interests: Electronic Commerce, Software Agents, Operations Research, Sensor Networks, Artificial Intelligence

score of at least 550 (paper-based), 213 (computer-based) or 79 (internet-based) to be considered for admission. Eligibility for a teaching or tutoring assistantship requires passing the test of spoken English (TSE) and achieving a TOEFL score of at least 600 (paper-based), 250 (computer-based) or 100 (internet-based).

Doctor of Philosophy

The applicant must have a bachelor's degree or a master's degree in computer science. In some cases, students with a degree in a closely related area may be considered.

Admission to the program is competitive, and requirements for admission to this program are more rigorous than for admission to the M.S. program. In order to be considered seriously, an applicant must normally have the equivalent of at least a 3.25 GPA (on a 4-point scale). The admissions committee will look at the applicant's overall academic record, as well as any relevant employment and professional experience. Of particular importance is evidence of the applicant's potential for scholarship and independent research at the Ph.D. level. International students are welcome. TOEFL exam requirements are the same as for the MS degree.

Financial Assistance

Teaching assistantships are available to graduate students. Teaching one section of a lower division service course requires 10 hours of work per week and qualifies the student for a waiver of graduate tuition. Other assistantships that provide a stipend and tuition waiver include research assistantships, which involve assisting faculty with their research, and graduate service assistantships, which involve tutoring, grading or computer-related work with faculty members or organizations on campus. Related previous experience increases the likelihood of a teaching or tutoring assistantship being awarded. For all assistantships, a student's chances are greater after he/she has been at NDSU one or two semesters.

The department offers a tuition waiver only to students who are awarded an assistantship. There is a scholarship program, that includes a tuition waiver, administered by the Dean of the Graduate School. Students should contact the Graduate School office for application forms.

An application for assistantship requires completing an online application sent to the department. Applications for fall semester received by April 15 will be given full consideration.

Degree Requirements

Master of Science

Semester core courses (required of all students):

CSci 708 Foundations of Programming
CSci 713 Software Engineering I

William Perrizo, Ph.D.
University of Minnesota, 1972
Research Interests: Distributed Database Systems, Centralized Database Systems

Saleem Salem, Ph.D.
Rensselaer Polytechnic Institute, 2009
Research Interests: Bio-Informatics and Data Mining

Brian Slator, Ph.D.
New Mexico State University, 1988
Research Interests: Artificial Intelligence, Educational Games

Vasant Ubhaya, Ph.D.
University of California-Berkeley, 1971
Research Interests: Algorithm Analysis, Operations Research

Dianxiang Xu, Ph.D.
Nanjing University, 1995
Research interests: Software Engineering, Software Security, Applied Formal Methods, Testing, Software Agents

Gurisimran Walia, Ph.D.
Mississippi State University, 2009
Research Interests: Empirical Software Engineering, Software Errors; Software Inspections and Software Quality Improvement, Requirements Engineering, Human Cognition in Software Engineering, Managing and Estimating Software Quality, Information Assurance, Software Engineering for Computer Security.

Changhui Yan, Ph.D.
Iowa State University, 2005
Research Interests: Bioinformatics, Computational Biology, Machine Learning and Data Mining

Weiyi (Max) Zhang, Ph.D.
Arizona State University, 2007
Research interests: Computer Networks; Wireless Networks and Network Security

Emeritus

Bruce Erickson, Ph.D.
Yale University, 1973
Research Interests: Theoretical Computer Science, Graph Theory

Robert Gammill, Ph.D.
Massachusetts Institute of Technology

CSci 724 Survey of Artificial Intelligence
CSci 765 Introduction to Database Systems

Thesis Option:
- 32 total graduate credits
- 12 core course credits plus two research seminar credits
- 8-12 credits of additional graduate coursework
- 6-10 credits of thesis research
- Research adviser should be selected by the fourth semester of attendance at NDSU
- Comprehensive Examination (on the core courses) completed by the end of the fourth semester.
- Final defense

Comprehensive Study Option:
- 32 total graduate credits
- 12 core course credits plus two credits of research seminar
- 14-16 credits of additional graduate coursework
- 2-4 credits of research
- Research adviser should be selected by the fourth semester of attendance at NDSU
- Comprehensive Examination (on the core courses) completed by the end of the fourth semester
- Final defense

A maximum of 9 semester credits may be transferred into the program. Such courses have to be approved on the plan of study. There may be a maximum of 6 credits of independent study.

All course work must be approved by the student's adviser, Supervisory Committee, department chair, and graduate dean through the plan of study.

Doctor of Philosophy
- 90 credits with up to 30 included from the M.S. degree
- 30 credits of research credit
- Research adviser should be selected by the fourth semester at NDSU
- Qualifying examination (written based on the M.S. core courses)
- Research proposal presentation and defense
- Dissertation
- Final defense

here are some additional requirements on the course work:
- The 90 credits must include three sequences of two courses each at the graduate level in computer science.
- Beyond the M.S. degree, a maximum of 9 credits of course work can be transferred. The remainder must be taken at NDSU.
- The 90 credits (including any credits transferred) must be computing-related with at least 45 credits involving significant graduate level computer science material. Generally, these credits would be offered by a computer science department.
- The 90 credits may include a maximum of 15 credits of non-didactic courses (independent studies or seminars). Seminars are limited to four of those credits.
- The student's advisory committee, the department chair, and the graduate dean all must approve the course work on the plan of study.

Community Development

Program and Application Information

Program Coordinator:	Dr. Gary Goreham
Location:	Barry Hall 226
Email:	Gary.Goreham@ndsu.edu
Telephone Number:	(701) 231-7637
Degrees Offered:	M.A., M.S.
Application Deadline:	International application materials must be received before May 1 for the fall semester and prior to August 1 for spring and summer semesters. Domestic applications must be received at least one month prior to the start of the semester.
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

The Department of Sociology, Anthropology, and Emergency Management in cooperation with the Department of Agribusiness and Applied Economics offer a master's degree in Community Development. The degree is a multi-institutional, multi-disciplinary, online program in conjunction with the Great Plains Interactive Distance Education Alliance (IDEA). Other institutions participating in this program include Iowa State University, Kansas State University, the University of Nebraska -Lincoln, and South Dakota State University.

The primary audience for this program is community economic development officials and specialists already employed in the field.

The program requires a total of 36 credit hours, including 16 credits (six courses) of Core, 15 credits in two of the four Track areas, and up to six credits of thesis. The four Track areas include Building Economic Capacity, Natural Resource Management, Working with Native Communities, and Non-profit Leadership.

Program Objectives

The objectives of the Community Development graduate degree program are to:

- Increase the skills, knowledge, and competencies of community economic development officials who are currently employed and have limited opportunity to participate in an on-campus degree program.
- Provide graduate training for individuals entering the community economic development career field who require training/degrees for career advancement.
- Enhance the community economic development skills, knowledge, and competencies of individuals working with Native American communities, natural resource-based communities, non-profit organizations, and/or state and local government.

Program Requirements

A total of 36 credits are required for the master's degree program. Students will write a thesis or complete a creative component (Plan B) to capstone the degree program, which will be worth six credit hours. The student's schedule of courses must be approved by the Faculty Advisor and the Campus Coordinator. Students may select either a Masters of Science (MS) or Masters of Arts (MA) option. The

MA option requirement normally includes two (2) years of a foreign language. This requirement can be satisfied with undergraduate courses and/or a proficiency examination.

Students will be required to take all of the six Core courses and an additional 15 credits selected from at least two tracks. The Core courses are:

- Community Development Orientation (1credit)
- Community Development I: Principles and Strategies of Community Change (3 credits)
- Community Development II: Organizing for Community Change (3 credits)
- Community Analysis: Introduction to Methods (3 credits)
- Community and Regional Economics and Analysis (3 credits)
- Community and Natural Resource Management (3 credits)

There are presently four tracks that have been developed from which students may choose. These include:

- Building Economic Capacity
- Natural Resource Management
- Working with Native Communities
- Non-profit Leadership

A sample schedule for a student in the Building Economic Capacity track may look as follows:

Year One

Fall Term	**Spring Term**	**Summer Term**
Community Development Orientation (1 cr.) Community Development I (3 cr.) Community Analysis: Introduction to Methods (3 cr.)	Community Development II (3 cr.) Community and Regional Economics and Analysis (3 cr.)	Community and Natural Resources Management (3 cr.)

Year Two

Fall Term	**Spring Term**	**Summer Term**
Economic Development and Strategies and Programs (3 cr.) Impact Analysis (3 cr.) Cost Benefit Analysis (3 cr.)	Cluster and Regional Economic Development Workshop (3 cr.) Thesis (2 cr.)	Real Estate (3 cr.) Thesis (3 cr.)

Total = 36 Credits

For additional information:
www.gpidea.org/prospective/community/cdProgram.html

Construction Management

Program and Application Information

Department Chair:	Dr. Yong Bai
Department Location:	AR/LA 106
Telephone Number:	(701) 231-7879
Degrees Offered:	M.S., Master of Construction Management, Certificate
Application Deadline:	For the Master of Science in Construction Management, March 15 for the fall semester and September 15 for the spring semester. For the Master of Construction Management, May 1 for the fall semester and October 1 for the spring semester.
Test Requirements:	GRE (M.S. applicants)
English Proficiency:	M.S. in Construction Management TOEFL ibT: 81, IELTS: 7, PTE Academic 54 Master of Construction Management TOEFL ibT: 79, IELTS: 6.5, PTE Academic: 53

Programs

The Department of Construction Management and Engineering offers three separate and distinct graduate programs as listed below followed by a description of each of the programs.

- Master of Science in Construction Management
- Master of Construction Management
- Graduate Certificate in Construction Management

Master of Science in Construction Management

Overview

The Master of Science in Construction Management is an on-campus research-focused degree consisting of 25 credits of didactic coursework, 6 credits of research work, and 1 credit of seminar culminating in a Master of Science thesis. In addition, students are expected to significantly contribute to the development and delivery of scholarly publications and to the development and submission of research grant proposals as determined by the major advisor.

Admission Requirements

To be admitted into the Master of Science in Construction Management applicants must:
Have earned a baccalaureate degree in construction, engineering, architecture, or other related discipline with a minimum CGPA of 3.0 or equivalent to attain full standing. Submission of an official transcript is required.

Faculty

Eric Asa, Ph.D.
University of Alberta, 2002
Research Interests: Infrastructure and Assets Management, Construction Materials, Engineering Education, Computational Modeling

Yong Bai, Ph.D.
North Carolina State University, 1996
Research Areas: Infrastructure construction and maintenance, international construction management, and emerging technologies in construction.

Bradley Bowen, Ed.D.
North Carolina State University, 2011
Research Interests: Engineering Education, K-12 Engineering, Project-based Learning

Darshi De Saram, Ph.D.
The Hong Kong Polytechnic University, 2002
Research Interests: Construction Coordination, Managing for Quality and Safety, Organizational Dynamics and Culture, Professional Education

Zhili (Jerry) Gao, Ph.D.
Iowa State University, 2004
Research Interests: Virtual Design And Construction (Visualization, BIM Development And Implantation), Advanced Concrete Techniques (Sustainable Concrete, New Concrete Materials And Structures)

Charles McIntyre, Ph.D.
The Pennsylvania State University, 1996
Research Interests: Sustainable Construction and Engineering, Construction and Engineering Education

Jongchul Song, Ph.D.
The University of Texas at Austin, 2005
Research Interests: Energy efficient building technology (thermal insulation performance), Asphalt pavement construction (temperature-density relation)

The Graduate Record Examination (GRE) is required for all applicants.
Submit a one-page "Statement of Research Objectives and Qualifications" that directly relates to one of the "Research Interests" of the CM&E faculty.
Submit a two-page resume.

Degree and Credit Requirements

The Master of Science in Construction Management requires a total of 31 graduate-level credits (24 credits of coursework, 6 credits of research/thesis, and 1 credit of seminar) and a thesis. The thesis requires the creation and presentation of new knowledge in providing a solution to a problem. Prior to submitting a thesis to the graduate student's Supervisory Committee, the thesis must be reviewed by a departmentally approved external editor. All costs associated with external review are the responsibility of the graduate student.

A Plan of Study for the Master of Science in Construction Management is shown below:

CM&E 790	Graduate Seminar	1 credit
CM&E 603	Scheduling and Project Control	4 credits
CM&E 611	Construction Cost Estimating	4 credits
CM&E 701	Construction Technology Equipment	4 credits
CM&E 612	Construction Management	3 credits
600 or 700-level electives*	9 credits	
CM&E 798	Master's Thesis	6 credits

* Electives may be any 600 or 700-level courses offered at NDSU as indicated in the Plan of Study determined by the student and the major faculty advisor.

A minimum cumulative grade point average (CGPA) of 3.0 must be achieved in order to complete the M.S. degree.

Financial Assistance

Various types of financial assistance are available to graduate students as described on the Graduate School website.

For exceptional applicants, the CM&E Department may offer a graduate assistantship which consists of a monetary stipend and a possible tuition waiver; however, student activity fees and program fees are not waived. There is no application process for graduate assistantships. Applicants are evaluated based on their credentials and/or experience. Please refer to graduate assistantships policy.

Master of Construction Management

Overview

The Master of Construction Management is an on-line professional program consisting of 30 credits of coursework and the Associate Constructor (AC) Exam or the Certified Professional Constructor Exam (CPC). The Master of Construction Management is administered through Distance and Continuing Education (DCE) at NDSU.

Admission Requirements

To be admitted into the Master of Construction Management applicants must:

Have earned a baccalaureate degree in construction, engineering, architecture, or other related discipline with a minimum CGPA of 3.0 or equivalent to attain full standing.
Submit a two-page resume.
Submit a one-page "Statement of Purpose" outlining your reasons for pursuing the Master of Construction Management.
Applicants who are deficient in the CGPA requirement are encouraged to apply for the Graduate Certificate in Construction Management. Although successful completion of the Graduate Certificate does not guarantee acceptance into the Master of Construction Management, the Graduate Certificate will be seriously considered in application decisions related to the Master of Construction Management

Degree and Credit Requirements

The Master of Construction Management degree consists of thirty (30) credits of course work and a passing grade in the Associate Constructor Exam or the Certified Professional Constructor Exam. The following nine (9) courses constitute the thirty (30) credits of coursework required for the degree

Required Courses

CM&E 603	Scheduling and Project Control	4 credits
CM&E 611	Construction Cost Estimating	4 credits
CM&E 612	Construction Management	3 credits
CM&E 630	Land Development	3 credits
CM&E 670	Information Technologies for CM's	3 credits
CM&E 701	Construction Technology and Equipment	4 credits
CM&E 710	Managing for Quality in Construction Orgs.	3 credits
CM&E 715	Construction Specifications and Contracts	3 credits
CM&E 740	Financial & Economic Concepts for CM's	3 credits

Schedule of Courses

Spring 2013

CM&E 670	Information Technologies for CM's	3 Credits
CM&E 701	Construction Technology and Equipment	4 Credits

Fall 2013

CM&E 603	Scheduling and Project Control	4 Credits
CM &E 611	Construction Cost Estimating	4 Credits
CM &E 612	Construction Management	3Credits
CM &E 715	Construction Specifications and Contracts	3 Credits

Spring 2014

CM&E 701	Construction Technology and Equipment	4 Credits
CM&E 710	Managing for Quality in Construction Orgs	3 Credits
CM&E 740	Financial & Economic Concepts for CM's	3 Credits

Fall 2014

CM&E 603	Scheduling and Project Control	4 Credits
CM&E 611	Construction Cost Estimating	4 Credits
CM&E 612	Construction Management	3 Credits
CM&E 630	Land Development	3 Credits

Both the Associate Constructor (AC) Exam and the Certified Professional Constructor" (CPC) Exam are administered by the American Institute of Constructors & Constructor Certification Commission. Typically, students take these nationally administered exams after their last semester of coursework. A passing grade in this exam achieves the designation of "certification" and is a requirement for awarding the degree. The exam may be taken multiple times. Based on their level of education and professional experience, students will select the exam that is most appropriate for their professional development. The AC Exam and the CPC Exam are offered twice a year, typically in March and November. International applicants should note that the AC exam is not offered on-line and is only offered in the United States.

The Associate Constructor (AC) certification is intended for constructors and supervisors who are in the early stages of their careers. The exam questions are primarily based upon education knowledge. The Certified Professional Constructor (CPC) certification is intended for the Professional Constructor who has been in the field for several years and exam questions cover both education and experience-based knowledge.

Financial Assistance

Graduate assistantships, tuition waivers, and financial aid offered by the offered by the CM&E Department, the Graduate School, or NDSU are not available to students in the Master of Construction Management.

Graduate Certificate in Construction Management

Overview

The Graduate Certificate in Construction Management provides an on-line course learning experiences constituting a distinct knowledge-base and a specific set of associated skills within the areas of estimating, scheduling, and project management at the graduate level. These three areas constitute a body of knowledge that represents the fundamental core of construction management. The proposed Graduate Certificate in Construction Management consists of eleven credits encompassing the following three (3) courses: CM&E 603 - Scheduling and Project Control (4 credits); CM&E 611 - Construction Cost Estimating (4 credits); and CM&E 612 - Construction Management (3 credits). The Graduate Certificate in Construction Management is administered through Distance and Continuing Education (DCE) at NDSU.

Admission Requirements

To be admitted into the Graduate Certificate in Construction Management applicants must:

- Have earned a baccalaureate degree in construction, engineering, architecture, or other related discipline with a minimum CGPA of 3.0 or equivalent to attain full standing.
- Submission of an official transcript is required.
- Submit a two-page resume.
- Submit a one-page "Statement of Purpose" outlining your reasons for pursuing the Graduate Certificate in Construction Management.
- Submit three (3) three letters of recommendation.
- Submit applications directly to the NDSU Graduate School via the on-line application process.

For the Certificate in Construction Management, application deadlines are May 1 for admission to the fall semester and October 1 for admission to the spring semester.

Degree and Credit Requirements

The Graduate Certificate Program in Construction Management requires the successful completion of eleven (11) credits of coursework, specifically:

CM&E 603	Scheduling and Project Control	4 credits
CM&E 611	Construction Cost Estimating	4 credits
CM&E 612	Construction Management	3 credits

Course Descriptions

CM&E 603 - Scheduling and Project Control

This course provides a discussion on the theories, principles, and techniques of construction planning and scheduling with an emphasis on time management, costs, and resources through the preparation and analysis of network schedules. Offered fall semester only.

CM&E 611 - Construction Cost Estimating

This course provides an advanced discussion of quantity takeoffs; labor, materials, equipment, and overhead costs; profit; and bidding strategies for construction projects. Offered fall semester only.

CM&E 612 - Construction Management

This course provides a discussion of the organization of project information; contract administration, project delivery systems; construction management methods; constructability review, value engineering; and construction productivity. Offered both fall and spring semesters.

Completion

Only grades of C or higher will satisfy requirements for certificate completion with a CGPA of 3.0 or greater. The Dean of the Graduate School, using official NDSU transcripts, will verify course completion and issue the certificate. Courses used to satisfy the Graduate Certificate requirements cannot be older than three years at the time the certificate completion is verified.

Financial Assistance

Graduate assistantships, tuition waivers, and financial aid offered by the offered by the CM&E Department, the Graduate School, or NDSU are not available to students in the Graduate Certificate in Construction Management.

Counselor Education

Program and Application Information

Department Head:	Dr. William Martin
Graduate Coordinator:	Dr. Jill Nelson
Email:	Jill.R.Nelson@ndsu.edu
Department Location:	SGC Building, 1919 N. University Drive
Telephone Number:	(701) 231-7202
Degrees Offered:	M.Ed., M.S.
Application Deadline:	February 1 for summer start
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Counselor Education Faculty

Jill Nelson, Ph.D.
Kent State, 2005
Research Interests: Community Counseling, Counselor Education Counselor Supervision, Brief and Solution-Focused Approaches

Carol E. Buchholz Holland, Ph.D.
Kansas State University, 2005
Research Interests: School Counseling; Career Education, Crisis Management Preparation, Trauma

Brenda Hall, Ed.D.
Virginia Polytechnic Institute and State University, 1993
Research Interests: Intimate Partner Violence, Community/School partnerships, Collaborative Group Practices Studies, and Substance Abuse Counseling

James Korcuska, Ph.D.
Kent State University, 2000
Research Interests: Counseling Research Methodology, Counselor Education, Men's and Gender Studies & Substance Abuse Counseling

Robert C. Nielsen, Ed.D.
University of Northern Colorado, 1973
Research Interests: School Counseling, Stress Management, Cognitive Counseling

Program Description

The Counselor Education Program offers graduate study leading to the Master of Education (M.Ed.), Master of Science (M.S.), Doctor of Philosophy (Ph.D.) degrees. Graduate majors in Counseling are offered at the master's level in the following areas: Clinical Mental Health Counseling and School Counseling. The doctorate is in Counselor Education and Supervision.

The master's degree serves as a foundation for national certification and state licensure as a professional counselor. All of our programs are accredited by CACREP until October 30, 2020. The School Counseling specialization is approved by the North Dakota Department of Public Instruction (DPI) and the North Dakota Education Standards and Practices Board (ESPB). Graduates of our master's programs are trained to be leaders in counseling practice who demonstrate an increased awareness of multicultural and diversity issues. The culture of the program is one of support from faculty, while maintaining high expectations of our students.

The doctoral program (Ph.D.) in Counselor Education and Supervision upholds the highest national standards as demonstrated by accreditation from the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The program is accredited until October 30, 2020. Graduates of our program are trained to be leaders in recognizing and respecting the needs of individuals and groups and demonstrate an increased awareness of multicultural and diversity issues. The culture of the doctoral program is one of individual attention and support from faculty so that students are able to develop a plan of study that best suits their individual needs and professional interests. There are a small number of students admitted each year so the faculty may build strong relationships with their advisees, as well as students in their classes. The counselor education faculty members mentor students in research and scholarship.

Admissions Requirements: Master's Degrees

The Counselor Education Program welcomes applications from all persons who meet the entrance requirements and highly encourages members of culturally diverse groups to apply. All applications for the program are due February 1 and are then reviewed by the faculty. Admission requires a minimum undergraduate cumulative GPA of 3.0 on a 4.0 scale, or a minimum GPA of 3.0 on 9 semester credits of

graduate course work. Personal and professional references and a detailed statement of purpose are also required. After an initial screening all application materials, selected applicants are invited for an on-campus interview. The Counselor Education faculty members will review this evidence and determine if an invitation to an interview will be granted.

Admissions Requirements: Doctoral Program

We consider applications for the fall and spring semesters. Deadlines are October 1st and May 1st. To be considered for acceptance, the applicant will be evaluated individually based upon but not limited to the following:

- Meet graduate school admissions requirements, including a Bachelor's Degree with a minimum grade average of 3.0;
- Possess a Master's degree in counseling or a related field. Graduates of CACREP accredited programs receive preference. If individuals do not have a master's degree, they may be considered, but must meet all CACREP requirements for a master's degree prior to taking core courses in the Ph.D. program;
- Demonstrate an interest in counseling, teaching, research, and professional service;
- Express counselor education and supervision career goals;
- Arrange for in-depth interview with the Counselor Education faculty at a date and time specified by the faculty;
- Meet the two-year cohort residency requirements and attend the program full time for those two years;
- Complete all international student requirements, where appropriate;
- Discuss, as appropriate, relevant personal history within the interview process;
- Sign a disclosure statement regarding activities, which may be deemed inappropriate by professional and/or ethical standards**.**

Financial Assistance

Limited graduate assistantships are available in the School of Education and on campus. We do not guarantee students an assistantship, but will alert students when we are aware of opportunities and support them in securing an appropriate assistantship. Students must be accepted into The Graduate School before they are eligible for an assistantship.

Degree Requirements: Master's Degrees

The school counseling master's track requires a minimum of 48 semester credits, the clinical mental health counseling track requires a minimum of 60 semester credits. Students can choose to either the M.S. degree or the M.Ed. degree. The Master of Science (M.S.) degree requires a disquisition and a minimum of 600 hours of internship. The Master of Education (M.Ed.) degree is a non-disquisition, practitioner-oriented degree, requiring a minimum of 900 hours of internship.

Degree Requirements: Doctoral Program

The doctoral degree in counselor education and supervision requires a minimum of 71 semester credits beyond the master's degree. Students must successfully complete required courses, electives, a 600 hour doctoral internship, comprehensive exams and a disquisition.

Criminal Justice

Program and Application Information

Interim Department Head:	Dr. Gary Totten
Department Location:	Criminal Justice & Public Policy
Telephone Number:	(701) 231-8567
Degrees Offered:	Ph.D., M.S.
Application Deadline:	April 1 for PhD applicants, Master's applications accepted for fall and spring enrollments on a rolling basis
Test Requirements:	GRE
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

The Department of Criminal Justice offers graduate study leading to both a MS and a Ph.D. degree in Criminal Justice. The MS degree has two tracks; Applied Criminal Justice and Criminology. The program in Criminal Justice is designed to enhance student's skills in understanding, gathering, processing, and analyzing research in the areas of criminology and criminal justice. The topical curriculum is geared to understanding, critiquing, and analyzing the criminal justice system with an orientation toward urban issues as they impact crime and criminal justice. The curriculum consists of foundation courses in theory, policy, and research methods, plus three substantive areas: 1) criminology, 2) policing, and 3) corrections. Students have their choice of specializing in one of the three. Elective course work can include classes such as Violence, Gender and Justice, and Crime Commodities. Students also will be afforded course work in learning how to teach a college course.

Graduates will find an expanding and terrific academic job market available as well as professional employment in the criminal justice policy and research sector. There are currently less than 40 Criminal Justice Ph.D. programs operating on a national level, so students graduating with a Criminal Justice Ph.D. will be competitive for the 350 positions available annually in academic units.

Ph.D. in Criminal Justice

Admissions Requirements

Students should enter the program with an approved master's degree. Students will be required to have had one course in research methods; and one course in statistics. Plus, students should have adequate background preparation or demonstrated potential in the field of Criminology or Criminal Justice.

Students will be required to take the Graduate Record Examination (GRE) and submit their undergradu-

Criminal Justice Faculty

Carol Archbold, Ph.D.
University of Nebraska-Omaha, 2002
Research Interests: Police Studies, Race and the Criminal Justice System, Alternative Dispute Resolution and the Criminal Justice System, Qualitative Research Methods

Sarah E. Browning, Ph.D.
University of Toronto, 2007
Research Interests: Substance Use and Abuse, Violence, Quantitative Methods, Criminological Theory

Thomas D. McDonald, Ph.D.
Southern Illinois University, 1972
Research Interests: Criminal Justice, Deviant Behavior, Social Disorganization, Evaluation Research

Amy J. Stichman, Ph.D.
University of Cincinnati, 2003
Research Interests: Corrections, Institutional Life, Inmate and Correctional Officer Attitude, Treatment Program Evaluation

Kevin M. Thompson, Ph.D.
University of Arizona, 1986
Research Interests: Delinquency, Quantitative Methods, Alcohol and Drugs, Juvenile Drug Courts

Political Science Faculty

Nicholas Bauroth, Ph.D.
Loyola University, 2003
Research Interests: State and Local Politics, Politics of Crime

Affiliated Faculty

Wendy Troop-Gordon, Ph.D.
University of Illinois at Urbana-Champaign, 2002
Research Interests: Violence and Aggression, Adolescent Development, Victimization, Quantitative Methods

Joel Hektner, Ph.D.
University of Chicago, 1996
Research Interests: Aggression, Research Methods, Peer Influence on Delinquency

ate and/or graduate transcripts. For admission to full standing, students are required to attain a combined minimum score on the GRE of 1,000 (verbal and quantitative) or 300+ on the new GRE scoring system and achieve a minimum grade point average of 3.0 over their last 60 credit hours. Students not meeting these standards will be evaluated and possibly admitted on conditional status.

A student entering the program with a master's degree would take a minimum of 60 credit hours. Students entering the program with a master's degree should submit their research thesis to the graduate committee for review. This committee would be charged with determining whether the research project is sufficient in scope and depth to warrant further supervised research.

Degree Requirements

Students admitted to the doctoral program who have earned a master's degree in criminal justice/ criminology will be given credit for their master's degree (up to 30 credits). The amount of credit for the master's degree will be determined by the graduate coordinator. The curricular structure of the program is listed below for students entering the program with a master's degree in criminal justice/criminology:

Theory/Policy Courses 9 credits

CJ 703	Advanced Criminology
CJ 709	Criminal Justice Policy
HUM 702	Introduction to College Teaching

Research Skills 12 credits

CJ 734	Advanced Criminal Justice Methods
STAT 725	Applied Statistics
STAT 726	Applied Regression and Analysis of Variance
	Note: STAT 725 is a prerequisite for this course
CJ 702	Program Evaluation

Electives 6 credits

CJ 607	Deviant Behavior
CJ 768	Gender and Justice
SOC 700	Qualitative Methods
CDFS 650	Adolescent Development
PSY 640	Experimental Methods
PSY 670	Experimental Social Psychology
STAT 660	Applied Survey Sampling
STAT 665	Meta-Analysis Methods

Substantive Areas - Students must complete four courses in substantive area of choice (12 credits) plus complete one course (6 credits) in each of their non-substantive areas (Total 18 cr.). 18 credits

Area A – Criminology	**Area B - Corrections**	**Area C - Policing**
CJ 606 Delinquency	CJ 661 Corrections	CJ 660 Criminalization
CJ 750 Violence	CJ 765 Crime Prevention	CJ 755 Administrative Policing
CJ 752 Criminogenic Commodities	CJ 762 Community Corrections	CJ 757 Community Policing
CJ 721 Individual Theories of Crime	CJ 707 Juvenile Corrections	CJ 760 Police and Race Issues
CJ 722 Structural Theories of Crime	CJ 763 Correctional Rehabilitation	CJ 761 Police Effectiveness

Dissertation/Indep. Studies 1-15 credits

Total: 60 credits

The curricular structure of the program is listed below for students entering the program with a master's degree that is not related to criminal justice/criminology:

Theory/Policy Courses 9 credits

CJ 703	Advanced Criminology
CJ 709	Criminal Justice Policy
HUM 702	Introduction to College Teaching

Research Skills 12 credits

CJ 734	Advanced Criminal Justice Methods
STAT 725	Applied Statistics
STAT 726	Applied Regression and Analysis of Variance
	Note: STAT 725 is a prerequisite for this course
CJ 702	Program Evaluation

Electives 18 credits

CJ 607	Deviant Behavior
CJ 768	Gender and Justice
SOC 700	Qualitative Methods
CDFS 650	Adolescent Development
PSY 640	Experimental Methods
PSY 670	Experimental Social Psychology
STAT 660	Applied Survey Sampling
STAT 665	Meta-Analysis Methods

Substantive Areas - Students must complete four courses in substantive area of choice (12 credits) plus complete one course (6 credits) in each of their non-substantive areas (Total 18 cr.). 18 credits

Area A – Criminology	**Area B - Corrections**	**Area C - Policing**
CJ 606 Delinquency	CJ 661 Corrections	CJ 660 Criminalization
CJ 750 Violence	CJ 765 Crime Prevention	CJ 755 Administrative Policing
CJ 752 Criminogenic Commodities	CJ 762 Community Corrections	CJ 757 Community Policing
CJ 721 Individual Theories of Crime	CJ 707 Juvenile Corrections	CJ 760 Police and Race Issues
CJ 722 Structural Theories of Crime	CJ 763 Correctional Rehabilitation	CJ 761 Police Effectiveness

Dissertation 33 credits

Total: 90 credits

MS Degree in Criminal Justice

Admission Requirements

Students will need to enter the program with a baccalaureate degree. Students will be required to have had one course in research methods, one course in statistics, and should document adequate background preparation or demonstrated potential in the field of Criminology or Criminal Justice. For admission to full-standing, students are required to achieve a minimum grade point average of 3.0 over their last 60 credit hours.

Degree Requirements

Students will need to declare their choice of a Track by the end of their first semester in the program.

Both Tracks require the completion of the following 5 Foundation Courses (15 Credits total)
Advanced Criminology
Criminal Justice Policy
Program Evaluation
Applied Statistics
Advanced Criminal Justice Methods

In addition to the Foundation Courses, students enrolled in the **Applied Track** must complete 1 course

I. Corrections	**II. Policing**	**III. Management-Related**
Corrections	Criminalization	Organizational Psychology
Community Corrections	Administrative Policing	Legal/Social Environment of Business
Crime Prevention	Community Policing	Organizational Communication I
Correctional Rehabilitation	Police Effectiveness	Human Resource Management
Juvenile Corrections	Police and Race Issues	

from each of the following 3 areas (9 credits total).
In addition to the Foundation Courses, students enrolled in the **Criminology Track** must complete 1 course from the Theory area (3 credits total) and 2 courses from the Elective Area (6 credits total).

I. Theory	**II. Electives**
Individual Theories of Crime	Crime and Delinquency
Structural Theories of Crime	Violence
	Criminogenic Commodities
	Deviant Behavior
	Advanced Psychopathology

Thesis or Policy Paper/Indep. Studies 6 credits.

Curriculum and Instruction (Teacher Education)

Program and Application Information

Department Chair: Dr. William Martin
Coordinator: Dr. Stacy Duffield
Department Location: School of Education, FLC 210
Telephone Number: (701) 231-7921
Degrees Offered: M.S., M.Ed.
Application Deadline: International applications are due May 1 for fall semester and August 1 for spring semester. Domestic applicants should apply at least one month prior to the start of classes
English Proficiency Requirements: TOEFL ibT 88; IELTS 6.5

Program Description

The School of Education offers graduate study leading to the Master of Education (M.Ed.) and Master of Science (M.S.) degrees. Graduate majors are offered in the following areas: Curriculum and Instruction, Agricultural Education, English Education, Family and Consumer Sciences Education, History Education, Mathematics Education, Music Education, Science Education, and Social Science Education. The graduate program in Teacher Education is committed to the further development of educational leaders who are dedicated to educational equity for all persons. The Teacher Education graduate program is aligned with the National Board for Professional Teaching Standards (NBPTS) to reflect the importance of applied research and content development of educators. Programs offered in Teacher Education are designed for the practitioner. Students pursuing the M.Ed. will engage in action research as a component of the program. Students are encouraged to work closely with an academic adviser to ensure that personal and professional goals are clear and achievable. Some of the options with unique features are described in more detail below and on the next page.

The NDSU programs in education are accredited by National Council for Accreditation of Teacher Education and are approved by the ND Education Standards and Practices Board. Changes in national and state legislation, standards, or rules can affect academic program requirements.

Admissions Requirements

Qualified students may apply for admission to graduate programs in the School of Education leading to Master of Education (M.Ed.) or Master of Science (M.S.) degrees.

Teacher Education (Core Faculty)

Stacy Duffield, Ph.D.
University of North Dakota, 2003
Research Interests: Middle School, Literacy, Learning Theory, and Instructional Practices

Mari Borr, Ph.D.
University of North Dakota, 2005
Research Interests: Qualitative Research, Family and Consumer Science Education, Adolescent Development, Experiential Learning, and Professional Development Evaluation

Bradley Bowen, Ed.D.
North Carolina State University, 2011
Research Interests: Engineering Education, K-12 Engineering, Project-based Learning

Larry Napoleon, Ph.D.
The Pennsylvania State University-University Park, 2009
Research Interests: Student Options and Retention, Career and Technical Education, Historically Disenfranchised Learners, African-American History

James M. Nyachwaya, Ph.D.
University of Minnesota, 2012
Research Interests: High School And College Students' Conceptual Understanding of the Particulate Nature of Matter, Pre-Service And In-Service Teachers' Pedagogical Content Knowledge (PCK) of Chemistry/Science

Florin Salajan, Ed.D.
Columbia University, 2007
Research Interests: Areas Of Expertise: Interactive Learning Technologies; Educational Technology Effectiveness For Teaching And Learning; Generational Attitudes Toward Learning Technologies; Comparative E-Learning; European Higher Education Policies; International Education

Justin J. Wageman, Ph.D.
University of North Dakota, 1999
Research Interests: Standards, Curriculum, Instruction, Assessment, Professional Development and Evaluation

Anita Welch, Ph.D.
University of Kansas, 2007
Research Interests: Science Education, Curriculum Design, "At-Risk" Youth, Informal Science Education

In addition to the Graduate School's required application materials, the program requires submission of a statement of career goals consistent with the five propositions of the National Board of Professional Teaching Standards NBPTS), http://www.nbpts.org/ as well as reasons for applying to the program. The School of Education reserves the right to obtain additional information about the student's professional competence from qualified professionals.

Admission is considered only after all required application materials have been received and reviewed. Where appropriate, all international student requirements must be met.

Admission decisions are based upon the predicted success of the applicant as a student and professional in the chosen field and are made only after considering all available data. A student must meet all requirements for full admission.

Brent Young, Ph.D.
Oklahoma State University, 2006
Research Interests: Building Academic Skills in the Context of Career and Technical Education, Student Learning and Achievement in Agricultural Education, Student teacher-cooperating teacher relationships, Experiential Learning

Associate Faculty

William Martin, Mathematics/STEM Education
Abraham Ayebo, Mathematics Education
Warren Christensen, Physics/STEM Education
Mila Kryjevskaia, Physics/STEM Education
Jenny Linker, Physical Education
Lisa Montplaisir, Biology/STEM Education
Erika Offerdahl, Bio Chemistry/STEM Education
Warren Olfert, Music Education
Kelly Sassi, English Education
David Silkenat, History Education
Michael Weber, Music Education

Curriculum and Instruction

The program focuses on further development of teacher leaders through study of instructional delivery and enhancement. The program curriculum includes areas of human development, learning, foundations of education, school curriculum, roles of schools and society, and further study in areas of interest. Candidates choosing this option for an M.S. degree must also complete a thesis.

Agricultural Education

See page xxx for additional information on this program.

English Education

Content-focused master's degree program in Teacher Education focus on increasing both pedagogical skills and content expertise. Candidates in these programs complete the four core pedagogical courses listed on the program of study and at least nine credits of master's-level content coursework; the total program of study is typically 33-36 credits. Candidates work with their graduate committee and adviser to identify an appropriate plan of study. This degree plan does not lead to teacher licensure, and candidates are encouraged to work their advisers if licensure is desired.

Family and Consumer Sciences Education

See page xxx for additional information on this program.

History Education

Content-focused master's degree program in Teacher Education focus on increasing both pedagogical skills and content expertise. Candidates in these programs complete the four core pedagogical courses listed on the program of study and at least nine credits of master's-level content coursework; the total program of study is typically 33-36 credits. Candidates work with their graduate committee and adviser to identify an appropriate plan of study. This degree plan does not lead to teacher licensure, and candidates are encouraged to work their advisers if licensure is desired.

Mathematics Education

Content-focused master's degree program in Teacher Education focus on increasing both pedagogical skills and content expertise. Candidates in these programs complete the four core pedagogical courses listed on the program of study and at least nine credits of master's-level content coursework; the total

program of study is typically 33-36 credits. Candidates work with their graduate committee and adviser to identify an appropriate plan of study. This degree plan does not lead to teacher licensure, and candidates are encouraged to work their advisers if licensure is desired.

Music Education

The Master of Education (M.Ed.) degree with a Music Education option is a dual program offered collaboratively by the School of Education and the Department of Music. The program is designed to facilitate the needs of currently working music teachers as well as students who wish to continue their education to the master's level after having completed the baccalaureate degree. It is possible to complete the M.Ed. degree in Music Education by attending three consecutive summer sessions, two years in residence during the academic year, or a combination of both. Most courses in the degree program are offered in the late afternoon or evening. Applied study may be in the areas of vocal, instrumental, or conducting. Students electing the choral emphasis will take vocal pedagogy and survey of choral literature. Students electing the instrumental emphasis will take instrumental pedagogy (woodwind, brass, or percussion) and survey of band literature. No thesis is required; rather, students will complete 2 three-credit hour practicum experiences: one in education and one in music. The practica will be agreed upon and planned jointly by the student and his/her adviser(s).

Science Education

Content-focused master's degree program in Teacher Education focus on increasing both pedagogical skills and content expertise. Candidates in these programs complete the four core pedagogical courses listed on the program of study and at least nine credits of master's-level content coursework; the total program of study is typically 33-36 credits. Candidates work with their graduate committee and adviser to identify an appropriate plan of study. This degree plan does not lead to teacher licensure, and candidates are encouraged to work their advisers if licensure is desired.

Social Science Education

Content-focused master's degree program in Teacher Education focus on increasing both pedagogical skills and content expertise. Candidates in these programs complete the four core pedagogical courses listed on the program of study and at least nine credits of master's-level content coursework; the total program of study is typically 33-36 credits. Candidates work with their graduate committee and adviser to identify an appropriate plan of study. This degree plan does not lead to teacher licensure, and candidates are encouraged to work their advisers if licensure is desired.

Financial Assistance

Graduate assistantships are available in the School of Education. Applications are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. Students must be accepted into The Graduate School before they are eligible for an assistantship.

Degree Requirements

All enrollments in Education courses before the student files a graduate plan of study must be approved by the adviser. The School of Education will evaluate graduate courses taken prior to filing the graduate plan of study when the student's plan of study is being considered. Only those courses approved by the School of Education may be included on the final plan of study leading to the degree. Master's programs within the School of Education require a minimum of 30 semester credits (minimums vary by academic program). The Master of Science (M.S.) degree requires a disquisition. The Master of Education (M.Ed.) degree is a non-disquisition, practitioner-oriented degree. Programs vary on requiring a written comprehensive exam or a portfolio/oral.

Developmental Science

Program and Application Information

Department Head:	Dr. James Deal
Graduate Coordinator:	Dr. Joel Hektner
Department Location:	Evelyn Morrow Lebedeff Hall
Email:	Joel.Hektner@ndsu.edu
Telephone Number:	(701) 231-8268
Degree Offered:	Ph.D.
Application Deadline:	February 1 Applications received after the deadline will be considered on a space-available basis.
Test Requirements:	GRE General
English Proficiency Requirements:	TOEFL ibT 100 (subscores of at least 24 for speaking and 21 for writing) IELTS 7

Program Description

Developmental Science is an emerging approach to the study of human development that combines elements of more traditional approaches from the fields of Developmental Psychology and Human Development. Developmental Science entails the study of human development across the lifespan, integrating the biological, cognitive, and socioemotional underpinnings of development, and incorporating the familial, social, institutional and cultural contexts in which development occurs.

Program Objectives

The purpose of the program will be to train doctoral students in Developmental Science. The program requires coursework and activities that will produce professionals with strong skills in research, teaching, and service who will be competitive on the job market. These professionals will have a strong, interdisciplinary understanding of developmental science that will enable them to assume positions of leadership in research, teaching, and community and government agencies.

Specific program objectives are as follows:

1. Students will acquire marked ability, knowledge, and research skills in developmental science.
2. Students will conduct original research in developmental science.
3. Students will acquire the ability to be effective teachers.
4. Students will be prepared to be professionals in developmental science.

Core Faculty

James E. Deal, Ph.D.
University of Georgia, 1987
Research Interests: Personality Development in Children; Research Methods

Margaret Fitzgerald, Ph.D.
Iowa State University, 1997
Research Interests: Birth-timing & Economic Outcomes; The Interface Between Family Business & The Family

Heather Fuller-Iglesias, Ph.D.
University of Michigan, 2009
Research Interests: Social Support and Family Dynamics Across the Lifespan; Psychosocial Aging; Cultural Contexts

Joel Hektner, Ph.D.
University of Chicago, 1996
Research Interests: Alcohol/Drug Abuse Prevention; Delinquency; Peer Affiliation Patterns/ Influences on Behavior

Melissa Lunsman O'Connor, Ph.D.
University of South Florida, 2010
Research Interests: Cognitive and Functional Aging in Healthy and Clinical Populations; Older Drivers; Research Methods; Attitudes toward Dementia

Brandy A. Randall, Ph.D.
University of Nebraska-Lincoln, 2002
Research Interests: Prosocial & Moral Development; Relationships; Positive/ Problem Behaviors

Elizabeth Blodgett Salafia, Ph.D.
University of Notre Dame, 2008
Research Interests: Family and Peer Influences on Adolescents' Disordered Eating Attitudes and Behaviors

Rebecca Woods, Ph.D.
Texas A&M University, 2006
Research Interests: Perception and cognition in infancy; object processing; multimodal processing; early gender differences

Affiliated Faculty with in HDFS

Kristen Benson, Ph.D.
Virginia Polytechnical Institute and State University, 2008
Research Interests: Gender Identity and Family/Partner Relationships, Diversity Issues in Family Therapy, Collaborative Approaches to Family Therapy Education and Training, and Qualitative Methodology

Program Delivery

The program will be delivered through traditional means, and students will be expected to be in residence at NDSU throughout the duration of the program. Although course instructors may incorporate online or hybrid delivery designs into their courses, the primary mode of instruction will be in small face-to-face classes and in one-on-one mentorship. Upon completion of coursework and in exceptional circumstances, students whose faculty advisors and committee members agree to work with them at a distance may be able to move elsewhere if necessary while completing the dissertation. In that case, the student and relevant faculty would need to mutually agree on a communication plan.

Program Requirements

Curriculum for students entering with a Bachelor's degree (90 credits total)

All courses 3 credits unless otherwise noted.
Students earn a Master's degree after completing 30 credits, oral examination and Master's thesis.
Students will be evaluated after the second year. Any who is deemed unfit to continue to the Ph.D. would be allowed to complete the Masters.

Didactic Core Courses (24 credits)
HDFS 702 College Teaching in Developmental Science
HDFS 703 Research Methods
HDFS 705 Quantitative Methods in Developmental Science
HDFS 756 Advanced Quantitative Methods
HDFS 758 Longitudinal Research Methods and Analysis
HDFS 782 Advanced Human Development: Birth through Childhood
HDFS 784 Advanced Human Development: Adolescence through Early Adulthood
HDFS 786 Advanced Human Development: Middle through Late Adulthood

Electives (16 credits)
Must include 9 credits in didactic 700-level courses in HDFS or other departments, including at least one course from HDFS 724, 725, 726
Maximum of 7 credits of HDFS 793 (beyond 17 required credits)
Maximum of 7 credits of HDFS 796 (beyond 4 required credits)

Non-didactic Courses (12 credits)
HDFS 790 Developmental Science Colloquium, to be taken 8 semesters (1 credit each)
HDFS 796 Readings and Research in Developmental Science (4 credits total)
The first and fifth years

Research Credits (38 credits total)

Sean Brotherson, Ph.D.
Oregon State University, 2000
Research Interests: Parenting; Family Life Education

Christie McGeorge, Ph.D.
University of Minnesota, 2005
Research Interests: Family Caregiving; Family Wellness; Premarital Counseling

Sharon Query, Ph.D.

Thomas Stone Carlson, Ph.D.
Iowa State University, 2000
Research Interests: Family Therapy Training & Supervision; Fathering

Affiliated Faculty outside of HDFS

Ben Balas, Ph.D.,
Psychology
Ardith Brunt, Ph.D.,
Health, Nutrition and Exercise Science
Ann Burnett, Ph.D.,
Women's Studies
Erin Conwell, Ph.D.,
Psychology
Donna Grandbois, Ph.D.,
Nursing
Daniel Klenow, Ph.D.,
Emergency Management
Linda Langley, Ph.D.,
Psychology
Susan Ray-Degges, Ph.D.,
Apparel, Design and Hospitality Management
Larry Reynolds, Ph.D.,
Animal Sciences
Greg Sanders, Ph.D.,
Human Development & Education
Molly Secor-Turner, Ph.D.,
Nursing
Kevin Thompson, Ph.D.,
Criminal Justice and Political Science
Wendy Troop-Gordon, Ph.D.,
Psychology
Kim Vonnahme, Ph.D.,
Animal Sciences
Rachelle Vettern, Ph.D.,
Center for 4-H Youth Development

HDFS 793 Individual Study (research) (17 credits)
HDFS 798 Master's Thesis (6 credits)
HDFS 799 Dissertation (15 credits)

Curriculum for students entering with a Master's degree (60 credits total)

All courses 3 credits unless otherwise noted.

Didactic Courses (21 credits total)
HDFS 702 College Teaching in Developmental Science
HDFS 756 Advanced Quantitative Methods
HDFS 758 Longitudinal Research Methods and Analysis
Four more didactic 700-level courses; could be outside of HDFS (to be approved by committee)

Other elective (3 credits): could include HDFS 793, 794, or 796, or 700-level course in HDFS or other department

Non-didactic Courses (9 credits total)
HDFS 790 Developmental Science Colloquium, to be taken 5 semesters (1 credit each)
HDFS 796 Readings and Research in Developmental Science (4 credits total). Four semesters, 1 credit each.

Research Credits (27 credits total)
HDFS 793 Individual Study (research) (12 credits)
HDFS 799 Dissertation (15 credits)

Other requirements
- Teach one undergraduate course, with supervision (as part of assistantship or for course credit in HDFS 794). Must have first taken HDFS 702.
- Submit at least four proposal/abstracts for presentations or posters at national conferences, including as a co-presenter (2 submissions if enter with MS)
- Present (in person) at least twice at national conferences (once if enter with MS), unless a waiver is granted by the student's committee.
- Submit at least two peer-reviewed articles for publication (including as co-author). Note: Although these presentation and publication requirements do not carry course credit per se, they are projects that would be worked on as part of HDFS 793, HDFS 796, and/or HDFS 799.
- Comprehensive/preliminary examination
- Dissertation: format to be determined by student's committee.

School of Education

Department Chair:	Dr. William Martin
Coordinators:	Dr. Ann Clapper (Educational Leadership), Dr. Stacy Duffield (Teacher Education), Dr. Myron Eighmy (Education Doctorate), Dr. Jill Nelson (Counselor Education)
Department Location:	School of Education, FLC 210
Telephone Number:	(701) 231-7921
Degrees Offered:	M.S., M.Ed., Ed.S., Ed.D., Ph.D.

School of Education Programs

The School of Education offers Masters, Specialist and Doctoral degrees in four program areas:

Counselor Education (MS, PhD) (page 87)

- School
- Community

Curriculum and Instruction (MEd, MS) (page 93)

- Agricultural Education (page 40)
- Family and Consumer Science (page 124)

Education Doctoral Program (Ed.D., PhD) (page 101)

- Adult and Occupational Education
- Institutional Analysis

Educational Leadership (MEd, MS, Ed.S) (page 103)

- School Principal or Superintendent
- Higher Education Administration

SOE Graduate Faculty

Counselor Education
Jill Nelson, Coordinator
Carol Buchholz Holland
Brenda Hall
James Korcuska
Robert Nielsen

Educational Leadership
Ann Clapper, Coordinator
Tom Hall
Denise Lajimodiere

Teacher Education (Associate Faculty)
William Martin, Mathematics/STEM Education
Abraham Ayebo, Mathematics Education
Warren Christensen, Physics/STEM Education
Mila Kryjevskaia, Physics/STEM Education
Jenny Linker, Physical Education
Lisa Montplaisir, Biology/STEM Education
Erika Offerdahl, Bio Chemistry/STEM Education
Warren Olfert, Music Education
Kelly Sassi, English Education
David Silkenat, History Education
Michael Weber, Music Education

Teacher Education (Core Faculty)
Stacy Duffield, Coordinator
Mari Borr, Family and Consumer Science
Bradley Bowen
Jeanette Hoffman
Larry Napoleon
James Nyachwaya, Chemistry Education
Kimberly Overton
Florin Salajan
Justin Wageman
Anita Welch
Brent Young, Agricultural Education

Education Doctorate
Myron Eighmy, Coordinator
Elizabeth Erichsen
Brent Hill
Claudette Peterson
Chris Ray
Nathan Wood

Education-Doctoral

Program and Application Information

Department Chair:	Dr. William Martin
Doctoral Graduate Coordinator:	Dr. Myron Eighmy
Department Location:	School of Education, FLC 210
Telephone Number:	(701) 231-7921
Degrees Offered:	Ph.D., Ed.D.
Application Deadline:	February 1
English Proficiency Requirements:	TOEFL ibT 88 IELTS 6.5

Program Description

The Education Doctoral Programs prepare scholars who will advance education research and practice and maintain the integrity and vitality of the profession. Our graduates will be stewards of the discipline, individuals entrusted with preserving, creating, and applying knowledge in education and with communicating educational knowledge to others. North Dakota State University offers both the Ed.D. and Ph.D. degrees in Education, with an emphasis in either **Institutional Analysis** or **Occupational and Adult Education**.

The ***Institutional Analysis*** curriculum was designed to provide the knowledge, skills and experiences necessary for understanding institutional performance both inside and outside of formal education settings. This option area focuses on the role of assessment, evaluation, and other research and analysis techniques in supporting institutional planning, policy formation, and decision-making.

The ***Occupational and Adult Education*** curriculum was designed to provide the knowledge, skills and experiences necessary for understanding the nature, function, and scope of adult learning both inside and outside of formal educational settings. This option area focuses on preparing individuals to engage in lifelong learning, working with adults of all ages and in all settings including workplace training and education, universities, adult literacy programs, adult basic education, community education, libraries, museums, and social service agencies.

Education Doctorate Faculty

Myron Eighmy, Ed.D.
University of Minnesota, 1995
Research Interests: Higher Education Policy, Training and Human Resources Development, State and Federal Policy for Workforce Education and Training

Elizabeth Erichsen, Ph.D.
University of Wyoming, 2009
Research Interests: International And Comparative Education; Qualitative Research Methodologies; Issues In Race, Class And Gender Relating To Access To Postsecondary And Higher Education; Multiple Selves And Adult Learner Identity Development; Lifelong Learning; European Models Of Adult And Continuing Education; Transformative Learning; Women's Issues And Non-Traditional Learners In Higher Education; And Critical Theory And Critical Media Literacy.

Brent D. Hill, Ph.D.
Oklahoma State University, 2011
Research interests: Research evaluation, measurement and statistics

Claudette Peterson, Ed.D.
Oklahoma State University, 2006
Research Interests/Areas of Expertise: Adult Education, Nonformal Education, Learning Strategies, Instrumented Learning

Christopher Ray, Ph.D.
Oklahoma State University, 2007
Research Interests: Institutional Analysis; Learning Outcomes Assessment; Moral Education; College Student Development; Research Methods

Nathan Wood, Ph.D.
University of Minnesota, 2006
Research Interests: Relationships Among Affective and Social Factors, Learning, and Achievement

Admissions Requirements

Qualified students may apply for admission through the Graduate School online application. In addition to the standard Graduate School application materials, applicants must submit an essay stating how their career goals align with the mission and goals of the Education Doctoral Programs. Admission is only considered after all required application materials are received by the Graduate School and reviewed by the program's faculty. An interview may be required. Admission is a selective process and decisions are based on the congruency of the applicant's professional goals with the program goals,

predicted success of the applicant as a student and professional in the chosen field, and are made only after considering all available data. A student must meet all requirements for unconditional admission. Application deadline is February 1.

Financial Assistance

Graduate assistantships may be available in the School of Education. Applications are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. Students must be accepted into the Graduate School before they are eligible for an assistantship.

Degree Requirements

All registrations in Education Doctoral courses must be approved by the student's adviser. Only those courses approved by the student's supervisory committee may be included on the final plan of study leading to the degree.

The Education Doctoral Programs require a minimum of 90 semester hours beyond the bachelor's degree (a minimum of 60 semester hours beyond the master's degree). Up to 30 credits of prior graduate level courses may be transferred into the program provided the courses meet the Graduate School transfer requirements and they are approved by the supervisory committee.

Educational Leadership

Program and Application Information

Department Head:	Dr. William Martin
Program Coordinator:	Dr. Ann Clapper
Department Location:	School of Education, FLC 210
Email:	Vicki.Ihry@ndsu.edu
Telephone Number:	(701) 231-7202
Degrees Offered:	Ed.S., M.S., M.Ed.
Application Deadline:	Domestic application materials are due two months prior to the start of classes. International application materials must be received before May 1 for the fall semester and prior to August 1 for spring and summer semesters.
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Educational Leadership Faculty

Ann Clapper, Ed.D.
Drake University, 1991
Research Interests/Areas of Expertise: Student Assessment, Program Evaluation, Dropout Prevention, Educational Change

Thomas Hall, Ed.D.
University of South Dakota, 2005
Research Interests: Community Education, Adult Learning

Denise K. Lajimodiere, Ed.D.
University of North Dakota, 2006
Research Interests/Area of Expertise: Native American Female Leadership; Horizontal Violence/Relational Aggression and girl bullying among young Native females living on reservations

Program Description

The Master's and Specialist degrees in Educational Leadership involve course work through the Tri-College University.

The principal purpose of the program is to provide professional/academic education for individuals preparing for mid-management administrative positions (that is, elementary school principal, secondary school principal or higher education administrator), and upper-level administrative positions (that is, superintendent of schools). The Educational Leadership program prepares students for Master of Education (M.Ed), Master of Science (M.S.) and Education Specialist (Ed.S.) degrees. Programs meet certification requirements in the various areas appropriate to K-12 administration.

The program is accredited by the National Council for Accreditation of Teacher Education and approved by the North Dakota Education Standards and Practices Board. Changes in national and state legislation, standards, or rules can affect academic program requirements.

Admissions Requirements

Required materials for the Education Specialist (Ed.S.) degree in Educational Leadership are:

- Official transcripts of all previous collegiate work, including one verifying graduation with a master's degree from an accredited institution;
- A cumulative GPA of 3.25 or higher in all graduate-level courses;
- Resume including credentials, licenses and certificates;
- Two references that evaluate the applicant's potential for success as a graduate student and as an educational leader; and
- A leadership essay.

For either the Master of Education (M.Ed.) or the Master of Science (M.S.) programs the required materials are:

- Official transcripts of all previous collegiate work, including one verifying graduation with a bachelor's degree from an accredited institution;
- A cumulative baccalaureate GPA of 3.0 on a 4.0 scale;
- Resume including credentials, licenses and certificates;
- Two references that evaluate the applicant's potential for success as a graduate student in the chosen master's degree program and as an educational leader; and
- A leadership essay.

Admission is considered only after all required application materials have been received and reviewed. Where appropriate, all international student requirements must be met.

Admission decisions are based upon the predicted success of the applicant as a student and professional in the chosen field and are made only after considering all available data. A student must meet all requirements for full admission.

After being accepted for graduate study in the School of Education, the student should contact an adviser assigned to her/him for assistance in filing a plan of study for consideration by the program.

NOTE: Earning an academic/professional degree does not necessarily lead to state credential or licensure. People seeking licensure must provide evidence of the required number of years of teaching or counseling experience and the appropriate licensure area and, in the case of the school superintendent credential, evidence of the required number of years of administrative experience. Potential and current students should consult with the program coordinator for advice about licensure, certification, or credentialing after communicating with the appropriate state official.

Financial Assistance

Graduate assistantships are available in the School of Education. Applications are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. Students must be accepted into The Graduate School before they are eligible for an assistantship.

Degree Requirements

The master's programs require a minimum of 36 semester credits (minimums vary by academic program). The Master of Science (M.S.) degree requires a disquisition. The Master of Education (M.Ed.) degree is a non-disquisition, practitioner-oriented degree. Programs vary on requiring a written comprehensive exam or a portfolio/oral.

Electrical and Computer Engineering

Program and Application Information

Interim Department Chair:	Dr. Rajendra Katti
Graduate Coordinator:	Dr. Rajesh Kavasseri
Email:	Rajesh.Kavasseri@ndsu.edu
Department Location:	101 Electrical Engineering Building
Telephone Number:	(701) 231-7019
Degrees Offered:	Ph.D., M.S., M.Engr.
Application Deadline:	February 28 for Fall and October 15 for Spring (openings may be very limited for spring)
Test Requirements:	GRE
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6 To qualify for teaching assistantship TOEFL ibT 100 IELTS 7

Program Description

The Department of Electrical and Computer Engineering offers graduate programs in selected specialty areas leading to the M.Engr., M.S. and Ph.D. in Electrical and Computer Engineering. Current departmental research expertise falls into one of the following areas: Signal Processing Group, Biomedical Engineering, Power/Power Electronics, Integrated Circuit, Electromagnetics, and Computer Engineering. The ECE Department is also a key contributor to NDSU's Research and Technology Park.

Admission Requirements

Admissions to the ECE program is on a competitive basis based upon the student's GRE scores, grade point average, and area of interest. Students who have graduated from an accredited electrical and computer engineering program in the United States with a B or better are encouraged to apply. Students with less than a B average may, under certain circumstances, be admitted on a conditional basis. Graduates from programs other than electrical and computer engineering--such as mathematics, physics, and other engineering areas--may be admitted if their average is B or better. However, they must satisfy or prove proficiency in the electrical and computer engineering undergraduate curriculum in effect at the time of matriculation. Normally, this means completing some undergraduate courses before pursuing graduate study. Some students may be able to take graduate and undergraduate courses at the same time. Students in this category should contact the department's graduate coordinator for specific details concerning their individual cases.

Faculty

Fei Dai, Ph.D.
Florida Atlantic University, 2005
Research Interests: Sensor Networks

Daniel L. Ewert, Ph.D.
University of North Dakota, 1989
Research Interests: Biomedical Engineering

David C. Farden, Ph.D.
Colorado State University, 1975
Research Interests: Communications, Systems, Signal Processing

Jacob Glower, Ph.D.
The Ohio State University, 1988
Research Interests: Control Systems, Digital Systems

Roger Green, Ph.D.
University of Wyoming, 1998
Research Interests: Signal Processing, Array Processing, Time-frequency Analysis

Joel A. Jorgenson, Ph.D.
Iowa State University, 1998
Research Interests: VLSI Design, Signal Integrity, Electronics

Rajendra Katti, Ph.D.
Washington State University, 1991
Research Interests: Computer Architecture, Parallel Processing

Rajesh G. Kavasseri, Ph.D.
Washington State University, 2002
Research Interests: Power Systems, Nonlinear Dynamics, Renewable Energy resources

Ivan T. Lima Jr., Ph.D.
University of Maryland, Baltimore County, 2003
Research Interests: Photonics

Robert M. Nelson, Ph.D.
North Dakota State University, 1987
Research Interests: Electromagnetics, Electromagnetic Compatibility

Floyd M. Patterson, M.S.
North Dakota State University, 1963
Research Interests: Computer Vision, Signal and Image Processing

V.V.B. Rao, Ph.D.
I.I.T., Madras, 1970
Research Interests: Circuits, Digital Systems

Academic Good Standing

All graduate students must maintain a 3.00 GPA or better and make significant progress towards their degree to remain in good standing. Failing to do either may hinder the student's financial assistance and/or ability to register for courses in the ECE graduate program.

Financial Assistance

The department has a limited number of both teaching and research assistantships available. These assistantships provide a monthly salary during the academic year, a waiver of graduate tuition during the academic year and summer, but do not cover the minimal activity fee. In addition, there are opportunities, both in the department and on the campus, to perform part-time work as graders, teachers, tutors, and consultants. These assistantships are awarded on a competitive basis -- typically at the time of admission for fall semester.

David A. Rogers, Ph.D.
University of Washington, 1971
Research Interests: Microwave Engineering, Electromagnetics, Fiber Optics

Mark Schroeder, Ph.D.
University of Texas, Austin, 1999
Research Interests: Biomedical Engineering

Sudarshan Srinivasan, Ph.D.
Georgia Institute of Technology, 2007
Research Interests: Computer Engineering

Chao You, Ph.D.
Rensselaer Polytechnic Institute, 2005
Research Interests: VLSI

Subbaraya Yuvarajan, Ph.D.
I.I.T., Madras, 1981
Research Interests: Power Electronics

Degree Requirements

The Master of Engineering and the Master of Science degrees require a minimum of 30 semester credits beyond the B.S. degree. The Master of Engineering is a course-work only program requiring a capstone consisting of a portfolio or written exam. For the paper or thesis options, 6 hours of the 30 must be assigned to the thesis while a maximum of 3 credits are assigned to the paper. All students must pass a final oral examination covering both course work, and the thesis or paper. The Doctor of Philosophy degree requires a minimum of 90 credits beyond the baccalaureate with an overall GPA of 3.0 or higher. Of these 90 credits, 30-40 credits may be assigned to the student's dissertation. The remainder must comprise of at least 36 credits in course work as chosen by the student and his/her supervisory committee. These must include two required courses: (ECE 702: Advanced Research Topics, 3 credits; ECE 703: Advanced Teaching and Classroom Topics, 3 credits).

Research Facilities and Equipment

The department is housed in a modern, well-equipped building. Graduate students have access to laboratories, instrument rooms, and computer services ranging from the university computer system to departmental computers. Research facilities include cardiovascular engineering lab, computer architecture lab, digital systems lab, EMI shield room, power and power electronics lab, signal processing and systems lab, and printed circuit lab.

Ph.D. in Engineering Requirements

In addition to the Ph.D. in Electrical and Computer Engineering, NDSU offers a Ph.D. in Engineering. This Ph.D. program is characterized as an interdisciplinary approach to engineering. A doctoral program for all engineering disciplines provides electrical and computer engineering students with general engineering knowledge and with in-depth understanding of one major specialty area, electrical engineering. The Ph.D. degree requires a minimum of 90 semester credits beyond the B.S. degree. Of these, 24 to 54 credits are to be in an area of concentration, 12 to 30 credits are from cognate and minor areas, and 30 to 40 credits comprise the doctoral dissertation. Students are required to pass a written qualifying examination on course work and a preliminary oral examination to qualify for Ph.D. candidacy. A final oral examination, primarily concerned with research work, is taken after the candidate has completed all course work and the dissertation.

Emergency Management

Program and Application Information

Department Head:	Dr. Daniel Klenow
Department Location:	107 Reinke Visual Arts Gallery
E-mail Address:	daniel.klenow@ndsu.edu
Telephone Number:	(701) 231-5595
Degrees Offered:	Ph.D., M.S.
Application Deadline:	February 15 for fall semester
Test Requirements:	GRE
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Faculty

Carol Cwiak, J.D., Ph.D.
Western State University, 1995
North Dakota State University, 2009
Research Interests: Preparedness and Mitigation, Business Continuity, Law and Emergency Management

Jessica Jensen, Ph.D.
North Dakota State University, 2010
Research Interests: Development of Emergency Management Discipline, Bureaucratization in Emergency Management

Daniel J. Klenow, Ph.D.
University of Notre Dame, 1977
Research Interests: Special Populations, International Disasters, Emergency Management
Theory and Methodology

Dong Keun (D.K.) Yoon, Ph.D.
Cornell University, 2007
Research Interests: Planning, Emergency Management, Geographic Information Systems (GIS)

George A. Youngs, Ph.D.
University of Iowa, 1981
Research Interests: Social Psychology, Research Methods, Sociology of Disasters, Emergency Management

Program Description

The mission of NDSU's Emergency Management Program is to create a cadre of graduates with extensive theoretical and applied knowledge in emergency management who can advance the field and discipline of emergency management. The program is built on a core of emergency management and methods/theory courses to help students approach the study of disasters and emergency management from the emergency management disciplinary perspective. Additionally, the program draws from other disciplines that enhance the development of processes and techniques to deal with emergencies and disasters.

The master's and doctoral degree programs in emergency management at NDSU are campus-based. Potential students are encouraged to visit the campus and meet faculty and current graduate students.

Admissions Requirements

Students can be admitted to our graduate program with either a baccalaureate degree (for admission to the master's program) or with an approved master's degree (for admission to the doctoral program). For admission in full standing to the master's program, students will be required to have a GPA of 3.2 or higher in their undergraduate *major and a 3.0 overall.* *The GRE is required for all applicants .* Applicants must submit their undergraduate and/or graduate transcripts. Students should have adequate background preparation or demonstrated potential in the field of emergency management.

For admission to the doctoral program in full standing, students must satisfy the admission requirements for the master's degree and have a masters degree in emergency management or a related field. Students entering the program with a master's degree will be required to complete a minimum of 60 credits.

The application process for Master's or Doctoral level studies is as follows:

- Complete the application form on the Graduate School webpage and submit the required materials. The deadline for submitting application materials is February 15th for the upcoming academic year.
- Request letters of reference in support of your application. Letters from faculty who have had you in undergraduate or graduate classes are preferred.
- All master’s and doctoral applicants must submit GRE scores. Specific GRE discipline tests are not

required. GRE scores are required for admission to the Emergency Management program because they provide another perspective on a student's academic abilities. At this time, no specific score totals are used as a cutoff. Applications are evaluated holistically using all indicators of student aptitude for successful graduate study in this program.

- Submit electronic copies of two academic papers that you have written to: Daniel J. Klenow, Ph.D., Professor and Chair, Department of Emergency Management (daniel.klenow@ndsu.edu). The papers do not have to focus on emergency management or disasters, but must be research papers written in English. Writing samples are used to gain information on the student's writing style and ability to write research-based papers. Papers submitted in support of an application would ideally be eight or more pages in length. In addition, to meet the objective of the admission criteria the paper must be a research paper that employs formal citations. Papers will most typically be library-based research papers but papers based on original data gathering are also encouraged. The latter might be more likely to come from an applicant with a master's degree.
- Master's and doctoral applicants meeting the aforementioned criteria for admission will participate in a conference call interview with two or more of the program faculty. Applicant interviews are designed to provide two-way communication between the faculty and prospective applicant. The faculty will ask questions but we also want the applicant to pose questions about the program and our educational objectives. The interview should assist the student and faculty to test the goodness of fit between the program and the applicant. Interviews will assess the applicant's ability to engage in evidence-based reasoning.
- We are most likely to accept doctoral applicants who demonstrate knowledge of the concepts discussed in the books on our Master's Reading List in their interview.
- The emergency management program at NDSU believes that the best doctoral degree program in emergency management will be made up of a diverse student body. We welcome applicants to our doctoral degree program with Master's degrees from a variety of disciplines; students from all countries; students with different professional backgrounds; and, students with varying goals and interests. We want to ensure however that students entering our program are knowledgeable about emergency management and some of the literature that provides the foundation for our discipline. Therefore, when applicants are interviewed during the application process, we expect that the best candidates will demonstrate their familiarity with the major concepts presented in the books on the reading list.
- By asking our potential doctoral students to enter our program with foundational knowledge of the emergency management literature we hope to accomplish several goals. First, in reading the books on the reading list, prospective students will be able to confirm their desire to pursue a doctoral education in the discipline of emergency management. Second, we assume that students who undertake this reading in preparation for their application interview will be bright and motivated students who are passionate about the study of emergency management--exactly the type of students we want to be a part of our doctoral student cohort. Third, and finally, a basic understanding of the emergency management literature will help students coming into our program from a variety of backgrounds succeed once they begin their studies at NDSU.

Financial Assistance

Both teaching and research assistantships are available contingent on departmental and faculty research funds. All students are automatically considered for graduate assistantships, unless they request otherwise, so no separate application process is required for such consideration. Awards are based on past academic and professional performance. The review process is highly competitive.

Master of Science Degree

The comprehensive and challenging Master's degree programs in Emergency Management are intended to explore the academic research literature related to emergency management as well as provide

students with opportunities to apply their knowledge through research and/or practicum. The program is built on a core of emergency management courses to help students learn how human beings create, interact, and cope with hazards, vulnerability, and associated events. The program emphasizes the study of how human beings cope with hazard events through activities related to preparedness, response, recovery, and mitigation.

The Department of Emergency Management offers two tracks in its master's degree program. The first option-the thesis track-is a research-focused degree track that entails a combination of emergency management coursework and research methods. This option is ideal for graduate students who intend to pursue a doctoral degree in Emergency Management or a related discipline and for those students who want to complete a traditional master's degree. The second option-the comprehensive study option -is a more practice-based track with coursework in emergency management and a significant practicum requirement.

Requirements for Emergency Management Master's Thesis Track
Core: Complete all courses (9 credits)
SOC 700: Qualitative Methods
SOC 701: Quantitative Methods
EMGT 720: Emergency Management Theory

Disaster Phases: Complete all courses (12 credits).
EMGT 761: Preparedness Theory and Practice
EMGT 762: Mitigation Theory and Practice
EMGT 763: Response Theory and Practice
EMGT 764: Recovery Theory and Practice

Electives: Select 3 courses from the following list (9 credits).
EMGT 620: Hazard, Risk, and Vulnerability Assessment
EMGT 610: Emergency Management Planning
EMGT 614: Spatial Analysis in Emergency Management
SOC 643: International Disasters
SOC 645: Special Populations and Disasters
EMGT 681: Disaster Analysis
EMGT 661: Business Continuity and Crisis Management
EMGT 663: Voluntary Agency Disaster Services
ANTH 664: Disaster and Culture
EMGT 696: Special Topics
ENGL 758: Topics in Rhetoric and Writing
EMGT 730: Advanced Research Methods

Practicum: (3 credits)
EMGT 795: Emergency Management Applied or Research Practicum

Thesis (minimum 6 - maximum 10 credits, only 6 count toward degree)
EMGT 798: Thesis Paper

TOTAL = 39 credits

Notes: *Students must complete a statistics course as a prerequisite for Quantitative Methods. Students must have completed an undergraduate research methods course prior to enrolling in Quantitative and Qualitative Methods.*
Those students lacking in field experience will be expected to complete an applied, field-based emergency management practicum; however, students with ample field experience in emergency manage-

ment will be expected to complete a research practicum to fulfill the practicum credits. The research practicum can be fulfilled by participating in a member of the faculty's research or by the student conducting his/her own research under the supervision of a faculty member. The student and his /her advisor will determine the type of practicum a student ought to take.

Requirements for Emergency Management Master's Comprehensive Study Track
Core: Complete all courses (15 credits).
EMGT 720: Emergency Management Theory
EMGT 761: Preparedness Theory and Practice
EMGT 762: Mitigation Theory and Practice
EMGT 763: Response Theory and Practice
EMGT 764: Recovery Theory and Practice

Electives: Select 6 courses from the following list (18 credits).
Group A: Emergency Management Elective Courses (12 credits)
EMGT 620: Hazard, Risk, and Vulnerability Assessment
EMGT 610: Comprehensive Emergency Management Planning
SOC 643: International Disasters
SOC 645: Special Populations and Disasters
EMGT 681: Disaster Analysis
EMGT 661: Business Continuity and Crisis Management
EMGT 663: Voluntary Agency Disaster Services
ANTH 664: Disaster and Culture
EMGT 696: Special Topics

*Group B: Critical Thinking and Analysis Elective C*ourses (6 credits)
ENGL 758: Topics in Rhetoric and Writing
STAT 725: Applied Statistics
SOC 700: Qualitative Methods
SOC 701: Quantitative Methods
EMGT 730: Advanced Research Methods
EMGT 614: Spatial Analysis in Emergency Management

Practicum: (6 credits)
EMGT 795: Emergency Management Applied or Research Practicum

Comprehensive Study Paper: (3 credits)
EMGT 797: Comprehensive Study Option

TOTAL = 42 credits

Notes: *Students must complete a statistics course as a prerequisite for Quantitative Methods. Students must have completed an undergraduate research methods course prior to enrolling in Quantitative and Qualitative Methods.*

Those students lacking in field experience will be expected to complete an applied, field-based emergency management practicum; however, students with ample field experience in emergency management will be expected to complete a research practicum to fulfill the practicum credits. The research practicum can be fulfilled by participating in a member of the faculty's research or by the student conducting his/her own research under the supervision of a faculty member. The student and his /her advisor will determine the type of practicum a student ought to take.

Doctoral Degree

North Dakota State University offers a Doctor of Philosophy in Emergency Management designed to prepare graduates for careers teaching future generations of emergency management students in higher education programs, conducting research that describes and explains patterns, processes, change, and effectiveness/efficiency related to emergency management, and/or policy development and analysis related to emergency management.

The degree program is built on a core of emergency management courses to help students learn how human beings create, interact, and cope with hazards, vulnerability, and associated events. The program emphasizes the study of how human beings cope with hazard events through activities related to preparedness, response, recovery, and mitigation. Additionally, the degree program requires students to choose two areas of concentration built on courses from disciplines outside of emergency management to complement their emergency management educational foundation.

This comprehensive and challenging program is committed both to extensive research and its practical application in the areas of emergency management. Throughout the graduate career, students will have the opportunity to conduct research and work in the field.

The Ph.D. is awarded in recognition of significant depth of understanding and scholarly achievement in emergency management. The recipient must complete all of the required course work, pass three written comprehensive exams (one on emergency management theory, one that applies the student's areas of concentration to emergency management, and one on research methods), complete a novel and significant research project for the dissertation; and successfully defend this research in an oral examination. The student's progress will be reviewed by a supervisory committee that is responsible for reviewing the student's plan of study, written comprehensive examinations, dissertation proposal, and dissertation defense.

Requirements for a Doctorate in Emergency Management
Core: Complete all courses (33 credits)
Group A: Theory and Methods (21 credits)
EMGT 720: Emergency Management Theory
ENGL 758: Topics in Rhetoric and Writing
SOC 700: Qualitative Methods
SOC 701: Quantitative Methods
EMGT 730: Advanced Research Methods
STAT 725: Applied Statistics
EMGT 614: Spatial Analysis in Emergency Management

Group B: Emergency Management Phase Courses (12 credits)
EMGT 761: Preparedness Theory and Practice
EMGT 762: Mitigation Theory and Practice
EMGT 763: Response Theory and Practice
EMGT 764: Recovery Theory and Practice

Emergency Management Electives (36 credits). **Students will complete 12-15 credits in Group A, 18-24 credits in Group B, and up to 6 credits in Group C.**
Group A: Emergency Management Elective Courses (12-15 credits).
EMGT 620: Hazard, Risk, and Vulnerability Assessment
EMGT 610: Emergency Management Planning
SOC 643: International Disasters
SOC 645: Special Populations and Disasters

EMGT 681: Disaster Analysis
EMGT 661: Business Continuity and Crisis Management
EMGT 663: Voluntary Agency Disaster Services
EMGT 696: Special Topics

Group B: Areas of Concentration (18 credits).
Business, Logistics and Security Management
· BUSN 630: Legal and Social Environment of Business-A
· CED 753: Not-for-profit Management-EO
· HDE 777: Advanced Stress Management (online)-EO
· MIS 770: Information Resources Management-A
· TL711: Logistics Systems-A
· TL719: Crisis Analysis and Homeland Security-A
· TL721: International Logistics Management-A
· EMGT 661: Business Continuity & Crisis Management (if not taken in Group A)-A

Communication
· COMM 725:725 Communication and Change-A
· COMM 783: Advanced Organizational Communication I-EO
· COMM 784: Advanced Organizational Communication II-EO
· COMM 785: Advanced Crisis Communication-A
· COMM 786: Risk Communication-EO

Community Development and Change
· CED 711: Community Development I: Principles & Strategies of Community Change (online)-A
· CED 713: Community Development II: Organizing for Community Change (online)-A
· CED 717: Community and Regional Economic Policy and Analysis (online)-A
· COMM 725: Communication and Change-A
· TL727: Organizational Change Management-A
· SOC 639: Social Change-EO

Environmental
· ECON 681: Natural Resource Economics-A
· ECS 770: Environmental Policy and Law-EO
· HIST 634: History and Politics of Environmental Science-A
· NRM 631: National Environmental Protection Act and Environmental Impact Assessments-A
· NRM 632: Environmental Impact Assessments-A
· NRM 702: Natural Resources Management Planning-A
· NRM 720: Natural Resources Administration and Policy-A
· SOC 631: Environmental Sociology-EO

Geology
· GEOL 612: Geomorphology
· GEOL 614: Hydrogeology
· GEOL 620: Mineralogy
· GEOL 657: Structural Geology
· GEOL 628: Geochemistry

International
· ANTH 664: Disaster and Culture -EO
· ECON 672: International Trade-A
· POLS 650: Politics of Developing Countries-A
· POLS 642: Global Policy Issues-EO

· TL721: International Logistics Management-A
· EMGT/SOC 643: International Disasters (if not taken in Group A)-EO

Social and Cultural· ANTH 650: Cultural Anthropology-A
· ANTH 662: Cultural Ecology-A
· ANTH 664: Disaster and Culture-EO
· SOC 610: Social Inequality-EO
· SOC 631: Environmental Sociology-EO
· SOC 639: Social Change-EO

Organizations
· BUSN 657: Leadership in Organizations-A
· BUSN 750: Advanced Organizational Behavior-A
· COMM 783: Advanced Organizational Communication I-EO
· COMM 784: Advanced Organizational Communication II-EO
· PSYCH 653: Organizational Psychology-EO
· TL727: Organizational Change Management-A

Public Health
· PHRM 710: Health Care Delivery in the U.S.
· PHRM 705: Public Health as a Team Endeavor
· MICR 650: Infectious Disease Pathogenesis
· MICR 670: Basic Immunology
· MGMT 753: Leading and Managing Public Health Systems
· MICR 674/SAFE 674: Epidemiology Environmental Health
· EMGT 715: Emergency Management for Public Health Professionals
· SAFE 604 Epidemiology of Foodborne Illness

Group C: Other electives (6 credits)[iv].

Practicum (6 credits)
EMGT 794: Emergency Management Applied or Research Practicum [v]

Dissertation (15 credits)

TOTAL = 90 credits

Notes: *Students must have taken a statistics course prior to enrolling in Quantitative Methods and must have taken an undergraduate or graduate research methods course prior to enrolling in both Quantitative and Qualitative Methods.*

Courses taken at the undergraduate level (400) cannot be retaken at the graduate level (600).
Pick a minimum of 1 area of concentration and complete a minimum of 9 credits within that area. Students may mix and match the rest of their electives in this section as desired. Note: To earn a second area of concentration a student must complete 9 credits within the additional area.

A indicates a course that is offered annually; and, EO indicates a course that is offered every other year.

Students will complete 3 comprehensive exams as part of the doctoral degree program. One exam will be to assess student knowledge of emergency management theory; one exam will be to assess student knowledge of methodology; and, one exam will be to assess student ability to apply what they learned

in their area(s) of concentration to the discipline of emergency management.

Note: *Courses in this section of electives are for prior thesis, comprehensive study, or technical papers completed as part of a master's degree program, didactic courses, seminars, independent study, and/or field research. Students may also take an additional 6 credits from Group B above.*

Those students lacking in field experience will be expected to complete an applied, field-based emergency management practicum; however, students with ample field experience in emergency management will be expected to complete a research practicum to fulfill the practicum credits. The research practicum can be fulfilled by participating in a member of the faculty's research or by the student conducting his/her own research under the supervision of a faculty member. The student and his /her advisor will determine the type of practicum a student ought to take.

English

Program and Application Information

Department Chair:	Dr. Kevin Brooks
Department Location:	219 Morrill Hall
Graduate Coordinator:	Dr. Bruce Maylath
Email:	Bruce.Maylath@ndsu.edu
Telephone Number:	(701) 231-7143
Degrees Offered:	M.A., Ph.D.
Application Deadline:	To be considered for admission and a teaching assistantship, applications must be completed by February 1 for fall semester.
Test Requirements:	GRE
English Proficiency Requirements:	TOEFL ibT 100 IELTS 7

Master of Arts

The Department of English, through its master's program, offers students the opportunity for intellectual growth and personal development; careers in diverse fields such as education, government, technical communication, law, public relations, theology, business; and studies leading to advanced degrees in such fields as English, law, creative writing, religious studies, and education.

Students may choose from two options within the masters in English: literature or composition. These options require ENGL 760, Graduate Scholarship, normally taken during the student's first or second semester in residence. In providing an opportunity for wide-ranging career choices through the two options, the department emphasizes critical thinking as an essential approach to the writing of papers, the making of oral reports, and the study of language and literature.

Admissions Requirements

The Department of English graduate program is open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full status to the program, the applicant must have completed a major in English at the undergraduate level.

Financial Assistance

Teaching assistantships are available and are based on the applicant's scholastic record and letters of recommendation. However, the student must first make application to the Graduate School and be accepted for admission before she/he is eligible for an assistantship in the Department of English. Letters of application for teaching assistantships should be submitted at the same time as the application to

Faculty

Elizabeth Birmingham, Ph.D.
Iowa State University, 2000
Field: Rhetoric and Professional Communication, Gender Studies, Architectural History, Theory, and Criticism

Kevin Brooks, Ph.D.
Iowa State University, 1997
Field: Rhetoric and Professional Communication, Computers and Composition, Writing Program Administration

Muriel Brown, Ph.D.
University of Nebraska, 1971
Field: Medieval Literature, Modern Drama, Women's Studies

Linda L. Helstern, Ph.D.
Southern Illinois University-Carbondale, 2001
Field: Native American Literature, Modernism, Contemporary Poetry, Literature and the Environment

R.S. Krishnan, Ph.D.
University of Nebraska, 1981
Field: Restoration and 18th-Century British Literature, Postmodern Theories, British Novel, Postcolonial Literature

Andrew Flood Mara, Ph.D.
University of New Mexico, 2003
Field: Technical and Professional Communication, New Media, Rhetoric and Composition

Miriam O'Kane Mara, Ph.D.
University of New Mexico, 2003
Field: Postcolonial Literature, Irish Modern and Contemporary Literature, British Victorian through Contemporary Literature

Bruce Maylath, Ph.D.
University of Minnesota, 1994
Field: International Technical Communication, Rhetoric and Composition, Linguistics

Robert O'Connor, Ph.D.
Bowling Green State University, 1979
Field: Romantic Literature, Science Fiction and Fantasy

Kelly Sassi, Ph.D.
University of Michigan, Ann Arbor, 2008
Field: English Education, Composition and Rhetoric, Native American Literatures, Culturally Responsive Pedagogy

the program is submitted to the graduate school and should specify experience and qualifications.

Graduate students are awarded teaching assistantships for the academic year only. As of the 2009-2010 academic year, the annual stipend is $8,500. University graduate tuition charges (not fees) are waived for all TAs. Teaching Fellowships are available to selected TAs after completing course work. Moreover, the Department of English annually awards the Rooney Scholarship and the Madeline S. Giddings Scholarship ($1,000) to deserving graduate students.

Dale Sullivan, Ph.D.
Rensselaer Polytechnic Institute, 1988
Field: Rhetoric Theory and History, Rhetoric of Science, Rhetoric of Religion, Technical Communication

Amy Rupiper Taggart, Ph.D.
Texas Christian University, 2002
Field: Writing and Rhetoric, Pedagogy, Literacy Studies

Verena Theile, Ph.D.
Washington State University, Pullman, 2006
Field: 16th-/17th-Century Literature, Early Modern Drama, European Literature, Cultural Theory

Gary Totten, Ph.D.
Ball State University, 1998
Field: Late 19th-/Early 20th-Century American Literature, Travel Literature, Multi-Ethnic American Literature

Degree Requirements

The Master of Arts program offers the option of completing 27 credit hours of letter-graded course work with an overall GPA of 3.0 or better, and a 3-credit master's paper. A thesis-oriented plan of study is also available with variable credit hours of letter-graded course work. Completion of intermediate competency in one foreign language is required.

Within the first semester of graduate work, each student is assigned an academic adviser who helps in overseeing the student's course work and paper committee. Students who plan to pursue a Ph.D. after completing their M.A. degrees are encouraged to work closely with their respective advisers in choosing the courses which best prepare them for doctoral work.

A graduate student in English should enroll in no more than 3 credits of ENGL 793, Individual Study/ Tutorial, during his/her master's career. Exceptions are provided for through a graduate form signed by the chair of the department and the adviser.

Literature Option

Students must
Complete ENGL 760 Graduate Scholarship and ENGL 762 Critical Theory.*
Complete 6 credits in British and 6 credits in American literature. At least three credits must be in pre-1900 American or pre-1660 British and at least three credits must be in post-1900 American or post-1660 British. Three credits in multicultural or post colonial literature is recommended.
Complete one course (3 credits) in Composition** or Linguistics.
Complete two elective courses (6 credits), literature recommended.
Complete ENGL 797 or 798 (Master's Paper or Master's Thesis)

Composition Option

Students must
Complete ENGL 760 Graduate Scholarship.*
Complete two required courses: ENGL 755 Composition Theory,* ENGL 756 Composition Research.
Complete three electives in Composition.**
Complete one course each in Literature and Linguistics.
Complete one elective.
Complete ENGL 797 or 798 (Master's Paper or Master's Thesis)

**Graduate students in any of the options are strongly advised to take Graduate Scholarship (ENGL 760) and, as appropriate, Critical Theory (ENGL 762) in their first year in the program. Students in the Composition Track planning to complete their course work in two years must take Composition Theory and Composition Research when they are offered, as those two core courses alternate.*
***ENGL 764 Classroom Strategies for TAs may be used to satisfy one Composition requirement.*

Entomology

Program and Application Information

Director:	Dr. Frank Casey School of Natural Resource Sciences
Program Leader:	Dr. Jason Harmon
Department Location:	Hultz Hall
Telephone Number:	(701) 231-7582
Degrees Offered:	Ph.D., M.S.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements:	TOEFL ibT 79 IELTS 6

Program Description

The Department of Entomology in the School of Natural Resource Sciences offers graduate study leading to the M.S. and Ph.D. degrees. Advanced work involves specialized training in the following areas: behavior, biochemistry, biodiversity, biological control, chemical ecology, ecology, host plant resistance, insect pathology, pest management, molecular genetics, physiology, and systematics. The Department also participates in interdisciplinary programs in Environmental and Conservation Sciences and Natural Resources Management.

The close working relationship between the Department and the USDA Red River Valley Agricultural Research Center, located on campus, provides students many opportunities for research and consultation. Students may conduct their research program under the direction of USDA scientists holding adjunct appointments in the Entomology.

Student research and academic programs are tailored to individual needs and interests. Interdisciplinary approaches to entomological programs are fostered. Prospective students are encouraged to check the Entomology web site (www.ndsu.edu/entomology/prospective_students/) for the latest descriptions of the graduate program.

Admissions Requirements

The Department of Entomology graduate program is open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full status to the program, the applicant must have adequate preparation in entomology and provide a letter stating reasons for pursuing an advanced degree in entomology and expressing the applicant's research interests.

Applications should be submitted directly to the Graduate School.

Faculty

Mark A. Boetel, Ph.D.
South Dakota State University, 1996
Research Interests: Integrated Pest Management of Sugarbeet and Corn Insects, Microbial Control

Stephen P. Foster, Ph.D.
University of Waikato, 1983
Research Interests: Insect Chemical Ecology, Pheromone Biochemistry, Reproductive Behavior

Jason P. Harmon, Ph.D.
University of Minnesota, 2003
Research Interests: Environmental Change and Ecological Interactions, Biological Control, Insect Ecology

Marion O. Harris, Ph.D.
Michigan State University, 1986
Research Interests: Insect Behavior, Insect-Plant Interactions, Resistance of Plants to Insects

Deirdre Prischmann-Voldseth, Ph.D.
Washington State University, 2005
Research interests: Agricultural integrated pest management and arthropod ecology

David A. Rider, Ph.D.
Louisiana State University, 1988
Research Interests: Systematics of the Pentatomoidea, Molecular Genetics, Ecology of the northern tall grass prairie arthropods

Financial Assistance

All specified application materials must be submitted to the Graduate School, and the student must be admitted in full or conditional standing to be considered for financial assistance. Graduate research assistantships are awarded on the basis of scholarship, potential for advanced study and research, and availability. Graduate research assistantships provide a monthly stipend and a waiver of graduate tuition.

Degree Requirements

The program requires a minimum of 24 months of full-time study, during which an overall GPA of 3.0 or better must be maintained. For M.S. candidates, a minimum of 30 semester credits beyond the B.S. and an oral defense of a research-based thesis and academic subject matter is required. The Ph.D. requires a minimum of 90 semester credits beyond the B.S., (or 60 beyond the MS degree), preliminary written and oral examinations directed toward academic subject matter, and a final oral defense of a research-based dissertation.

Environmental and Conservation Sciences

Faculty

See page 121

Program and Application Information

Program Director:	Dr. Craig Stockwell
Program Location:	Department of Biological Sciences, Stevens Hall
Email:	Craig.Stockwell@ndsu.edu
Telephone Number:	(701) 231-8449
Degrees Offered:	Ph.D., M.S.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring semester. Domestic applicants should apply at least one month prior to the start of classes
English Proficiency Requirements:	TOEFL ibT 79 IELTS 6

Program Description

The graduate program leading to an M.S. or a Ph.D. in Environmental and Conservation Sciences rests on an integrative curriculum and a multidisciplinary team approach. The program emphasizes the common ground shared by all sciences, and seeks to bridge methodological and philosophical boundaries that might hinder interdisciplinary communication and cooperation. The program offers two tracks: Environmental Science and Conservation Biology. The Environmental Science track focuses on abiotic environmental issues, such as water, air, and land pollution, while the Conservation Biology track focuses on biotic issues, such as the preservation of biodiversity and ecosystem function. The interdisciplinary nature of this program is reflected by the participation of faculty from across the campus, including the Colleges of Agriculture, Food Systems, and Natural Resources; Arts, Humanities, and Social Sciences; Engineering and Architecture; and Science and Mathematics.

Environmental Science

Areas of environmental studies, such as climate change, groundwater, hazardous waste, and water chemistry, require broad training across discipline lines for successful application. To better predict anthropogenic environmental impacts, the engineering, earth material, chemical, and biological data must be considered in an integrated manner.

Conservation Biology

Conservation Biology offers a new philosophy of looking at complex problems. This discipline focuses on the loss of regional and global biodiversity, but considers the human element as well in its approach to resource issues. As an example, landscape ecology, sustainable development, and conflict resolution are themes promoted by the field of Conservation Biology.

Admissions Requirements

To be admitted to the Environmental and Conservation Sciences program, the applicant must meet the Graduate School requirements listed on page

Financial Assistance

The applicant should contact a prospective mentor to identify sources of financial aid. Teaching and research assistantships may be available through funded research or participating departments. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research. Contact the Student Financial Services for information and applications regarding scholarships.

Degree Requirements

By the end of the first academic year, the student will select an academic adviser from among the ECSP graduate faculty and arrange for the appointment of a Graduate Advisory Committee. A Graduate Advisory Committee will consist of at least four members of the NDSU graduate faculty. The committee must include the student's adviser, two additional ECSP faculty members, and an appointee of The Graduate School. One committee member must be from outside the student's academic college. The plan of study will be prepared by the student, in consultation with the major adviser, by the end of the first year in residence. The plan shall be approved by the student's Graduate Advisory Committee, the Environmental Science Steering Committee, the department chair, the academic dean, and The Graduate School dean according to the regulations outlined in the NDSU Graduate Bulletin.

Master of Science in Environmental and Conservation Sciences

The total credits will be not less than 30 graduate credits, with at least 16 credits of didactic courses numbered from 601-689 or 700-789, plus the ECS graduate seminar for 1 credit, and research credits (798) not fewer than 6 nor more than 10 thesis credits. The didactic credits must include at least 1 ECS core course. All M.S. students must complete a thesis and pass a final examination as described in The Graduate School Policies section of the Graduate Bulletin. An overall GPA of 3.0 or better must be maintained.

Doctor of Philosophy in Environmental and Conservation Sciences

Each Ph.D. student will complete at least 27 credits of didactic courses plus the ECS graduate seminar for 1 credit. The didactic courses will include: 3 core courses (9 credits), a minimum of 15 credits from a chosen track, and 3 credits of electives from the other track or other NDSU courses numbered 601-689 or 700-789. The 15 track credits must be from at least 2 course categories. A total of 90 credits are required. An overall GPA of 3.0 or better must be maintained. The plan of study must be filed in the Graduate School prior to scheduling the comprehensive/preliminary oral examination.

Core Courses

History of Environmental Science	HIST634 or HIST 710	3 cr
Rhetoric of Environmental Science	COMM 755	3 cr
Environmental Law and Policy	ECS 770	3 cr
Natural Resources Economics	ECON 681	3 cr
Environmental Sociology	SOC 631	3 cr
Environmental Management	ECS 740	3 cr

Conservation Biology Track- Total 18 credits

Biodiversity 3-9 cr: ARSC 716; BOT 671, 672, 714, 717; ENT 750; ZOO 650, 652, 654, 658, 665

Ecology and Evolution 3-9 cr: ARSC765; BIOL 631, 640, 659 750; BOT 660, 762, 764; ENT 765, 770; GEOL 640; PLSC 631, 737, 781; SOIL 610, 640, 647; ZOO 662, 670, 750, 760, 770, 776, 784

Human Dimensions and Management 3-9 cr: ANTH 650, 662; ARSC 656; CE 678; AGEC 680; COMM 755, 783; CS 750, 760; POLS 642, 650; ZOO 672, 674, 675, 676, 677, 750

Research Tools 3-9 cr: ARSC650, 740; CE 677; GEOL 655, 656, 660, 760; PLSC 724; PSYC640; SOC 701; SOIL 784; STAT661, 662, 663, 665, 670, 730, 761, 770

Environmental Sciences Track-Total 18 credits

Water Sciences 3-9 cr: ABEN 664, 765; CE 610, 677, 678, 697, 776, 796; GEOL 640; ZOO 670

Soil and Solid Waste 3-9 cr: ABEN 696; CE 672, 770; SOIL 610, 633, 733, 783

Environmental Management 3-9 cr: ARSC 656; CE 672, 678; COMM 783; ECS 750, 760; ZOO 674, 675, 676, 677

Research Tools 3-9 cr: ABEN 682, 696; ARSC 650, 740; CE 677; GEOL 655, 656, 660, 760; IME 660; STAT 662, 725,761

Preliminary Examinations for Doctoral Students

The written Preliminary Examination will cover the core areas for ECSP and each of the core topic areas for the appropriate track. The preliminary examination will typically be taken in the middle of the third year. The written exam must be passed before the comprehensive oral examination can be scheduled.

The comprehensive oral examination will be taken no later than the end of the third year in residence. The examination will cover the topic areas for the appropriate track.

Dissertation Research

A proposal describing research suitable for preparation of a dissertation in Environmental and Conservation Sciences will be prepared in the format of a NSF Dissertation Improvement Grant. Alternative formats must be agreed to by the Graduate Advisory Committee. The proposal will be submitted to the student's Graduate Advisory Committee for review and approval. The dissertation must show originality and demonstrate the student's capacity for independent research.

Program Administration

The graduate program will be administered by the ECSP Steering Committee. The committee will be composed of four ECSP graduate faculty members representing four different colleges: Agriculture, Food Systems, and Natural Resources; Arts, Humanities, and Social Sciences; Engineering and Architecture; and Science and Mathematics. Four alternate members will also be selected to substitute on the committee when necessary. Steering Committee members, who serve overlapping three-year terms, will be elected at a yearly meeting of the ECS faculty. The ECS Program Director will preside over ECS Steering Committee meetings. The duties of the ECS Steering Committee will include 1) review of requests to join the ECS faculty and 2) program review and administration.

Faculty

F. Adnan Akyuz, Ph.D.
University of Missouri-Columbia, 1994
Research Interests: Applied Climatology and Microclimatology/Climate Based Agriculture

Allan C. Ashworth, Ph.D.
University of Birmingham, 1969
Research Interests: Quaternary Paleoecology, Paleoclimatology

Achintya Bezbaruah, Ph.D.
University of Nebraska-Lincoln, 2002
Research Interests: Nanomaterials for Pollution Control, Recalcitrant and micro pollutants, Contaminant fate and transport, Small community water and wastewater treatment, Environmental sensors, Environmental management

William J. Bleier, Ph.D.
Texas Tech University, 1975
Research Interests: Vertebrate Management, Habitat Management, Geographic Information Systems

Malcolm G. Butler, Ph.D.
University of Michigan, 1980
Research Interests: Aquatic Invertebrate Biology, Limnology, Wetland Ecology

Patrick M. Carr, Ph.D.
Montana State University, 1989
Research Interests: Sustainable Agriculture, Cropping Systems

Frank X.M. Casey, Ph.D.
Iowa State University, 2000
Research Interests: Field and Laboratory Studies of Water Flow and Chemical Transport Processes

Larry Cihacek, Ph.D.
Iowa State University, 1979
Research Interests: Carbon Sequestration in Soils, Soil Physical Properties, Soil Management for Waste Disposal

Gary K. Clambey, Ph.D.
Iowa State University, 1975
Research Interests: Ecology and Biogeography, Environmental Analysis and Planning, Structure Function Relations in the Midwestern Ecosystems

Mark E. Clark, Ph.D.
University of Tennessee, 1996
Research Interests: Population Ecology, Landscape Ecology, Fish and Wildlife Ecology, Ecological Modeling, Spatial Modeling, Species Interactions

Davis Cope, Ph.D.
Vanderbilt University, 1980
Research Interests: Partial Differential Equations, Numerical Methods, Applied Mathematics

Dennis Cooley, Ph.D.
University of Rochester, 1995
Research Interests: Ethics of Science

David B. Danbom, Ph.D.
Stanford University, 1974
Research Interests: Agriculture and Rural Life, Recent U.S., Progressive Period

Thomas M. DeSutter, Ph.D.
Kansas State University, 2004
Research Interest: Trace Gas Fluxes, Inorganic Soil Chemistry, Soil Environmental Conditions

Theodore L. Esslinger, Ph.D.
Duke University, 1974
Research Interests: Lichenology, Taxonomy, Chemosystematics, Floristics of Lichens, Emphasis on the Alectoriacea, Parmeliaceae and Physciacae

Erin Gillam, Ph.D.
University of Tennessee, 2007
Research Interests: Behavioral ecology of bats, ecological and evolutionary basis of behavior in all animal groups, behavioral, ecological, and evolutionary factors influence the structure of animal communication signals and wildlife ecology and conservation.

Gary A. Goreham, Ph.D.
South Dakota State University, 1985
Research Interests: Rural Sociology, Community, Family Research Methods, Sociology of Religion, Sociology of Agriculture

Kendra Greenlee, Ph.D.
Arizona State University-Tempe, 2004
Research interests: Environmental and respiratory physiology of insects; insect immunology.

James W. Grier, Ph.D.
Cornell University, 1975
Research Interests: Animal Behavior and Ecology, Animal Population Dynamics, Applied Biostatistics, Philosophy of Research

Jason Harmon, Ph.D.
University of Minnesota, 2003
Research Interests: Environmental change; ecosystem services; population and community ecology

Marion O. Harris, Ph.D.
Michigan State University, 1986
Research Interests: Insect-Pest Management, Host-Plant Relationships

Mark Harvey, Ph.D.
University of Wyoming, 1986
Research Interests: American West, Environmental History, Public History

Harlene Hatterman-Valenti, Ph.D.
Iowa state University , 1993
Research Interests: High-Value Crop Production

Robert R. Hearne, Ph.D.
University of Minnesota , 1995
Research Interests: Economic Analysis of Emerging Environmental and Resource Issues in the Northern Great Plains

David Hopkins, Ph.D.
North Dakota State University, 1997
Research Interests: Soil Formation and Chemistry

Tom Isern, Ph.D.
Oklahoma State University, 1977
Research Interests: History of Agriculture, History of Great Plains

Donna Jacob, Ph.D.
University College, 2004
Research Interests: Wetland ecology, biogeochemistry, ecophysiology and ecotoxicology

Xinhua Jia, Ph.D.
University of Arizona, 2004
Research Interests: Evapotranspiration, Subsurface drainage and Water quality

Dinesh Katti, Ph.D.
University of Arizona, 1991
Research Interests: Geotechnical Engineering, Constitutive Modeling of Geologic Materials, Expansive Soils, Multiscale Modeling, Steered Molecular Dynamics, Computational Mechanics, Nanocomposite, and Bio-nanocomposites. Computational Biophysics

Eakalak Khan, Ph.D.
UCLA, 1997
Research Interests: Water Quality, Biological Process Development for Water and Wastewater Treatment, Storm water and Non-Point Source Pollution Control

F. Larry Leistritz, Ph.D.
University of Nebraska, 1970
Research Interests: Economic Development, Resource Economics

Kenneth E. Lepper, Ph.D.
Oklahoma State University, 2001
Research Interests: Quaternary Geology and Age Dating

Adam R. Lewis, Ph.D.
Boston University, 2005
Research Interests: Long-term Climate Evolution, Antarctic Climate Evolution, and Glacial Geology

Wei Lin, Ph.D.
SUNY at Buffalo, 1992
Research Interests: Water and Wastewater Treatment, Hazardous Waste Management

John McEvoy, Ph.D.
University of Ulster Northern Ireland, 2002
Research Interests: Cryptosporidium Virulence Factors and Mechanisms of Pathogenesis

Mark Meister, Ph.D.
University of Nebraska, 1997
Research Interests: Rhetorical and Critical Theory, Environmental Communication

Bakr Mourad Aly Ahmed, Ph.D.
Virginia Tech., 2001
Research Interests: Sustainability Indicators and Implementation, Carrying Capacity Measurements, Coastal Development, Built Environment and Natural Resources Conservation

Peter Oduor, Ph.D.
University of Missouri - Rolla, 2004
Research Interests: Geographic Information Systems, Groundwater Flow Modeling, Groundwater Contamination

Marinus Otte, Ph.D.
Vrije Universiteit, 1991
Research Interests: Wetland ecology, Biogeochemistry, Ecophysiology and Ecotoxicology

Laura F. Overstreet, Ph.D.
North Carolina State University, 2005
Research Interests: Soil Conservation and Management, Soil Biology, Reduced Tillage Systems, Sugarbeet Production

G. Padmanabhan, Ph.D.
Purdue University, 1980
Research Interests: Hydrology, Water Resources, Hydraulic Engineering

Birgit Pruess, Ph.D.
Ruhr- Universitat Bochum, 1991
Research Interest: Microbial Physiology and Gene Regulation

Wendy L. Reed, Ph.D.
Iowa State University, 2000
Research Interests: Physiological Ecology, Wetland and Bird Ecology, Environmental Endocrinology

David A. Rider, Ph.D.
Louisiana State University, 1988
Research Interests: Insect Systematics, Biodiversity

David C. Roberts, Ph.D.
Oklahoma State University, 2009
Research Interests: Evaluation and design of economically efficient tools and policies for pollution control, economic valuation of environmental and ecological attributes through revealed and stated preference methods, valuation of environmental risk, and low-impact and precision agriculture

Bernhardt Saini-Eidukat, Ph.D.
University of Minnesota, 1991
Research Interests: Environmental Geochemistry, Igneous Petrology, Economic Geology

Donald P. Schwert, Ph.D.
University of Waterloo, 1978
Research Interests: Quaternary Paleoecology, Analysis of Fossil Insects

Dean D. Steele, Ph.D.
University of Minnesota, 1991
Research Interests: Irrigation and Environmental Engineering

Craig A. Stockwell, Ph.D.
University of Nevada, 1995
Research Interests: Conservation Biology, Evolutionary Ecology of Native Fishes, Human-Wildlife Interactions

Steve E. Travers, Ph.D.
University of California, 1998
Research Interests: Plant Evolutionary Ecology

George Youngs, Ph.D.
University of Iowa, 1981
Research Interests: Perceived Ethics of Genetically Modified Organisms, Sustainable Agriculture

Adjunct

George M. Linz, Ph.D.
North Dakota State University, 1982
Research Interests: Avian Ecology

Brian D. Wisenden, Ph.D.
University of Western Ontario, 1993
Research interests: Behavioral ecology of fishes, chemical ecology of predator-prey interactions, parental care and mating systems

Environmental Engineering

Program and Application Information

Department Chair:	Dr. Eakalak Khan
Program Location:	201 Civil and Industrial Engineering
Telephone Number:	(701) 231-7244
Degree Offered:	M.S.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

The Department of Civil Engineering offers a graduate program leading to a Master of Science degree in environmental engineering. The M.S. degree in environmental engineering is offered through a program designed to advance the technical knowledge, competence, and interdisciplinary understanding of the students and to prepare them for entering or advancing within the environmental engineering profession.

The graduate curriculum in environmental engineering offers courses designed to prepare the student with engineering fundamentals as applied to the environment. To complement the major area of study, additional courses are often selected from other disciplines. Students without a B.S. degree in civil engineering will take remedial undergraduate courses to gain an appropriate background in civil engineering.

Faculty

Achintya N. Bezbaruah, Ph.D.
University of Nebraska-Lincoln, 2002
Research Interests: Environmental sensors, Recalcitrant and micro pollutants, Contaminant fate and transport, Small community water and wastewater treatment, Environmental management

Xuefeng (Michael) Chu, Ph. D.
University of California, Davis, 2002
Research Interests: Watershed Hydrologic and Environmental Modeling, Overland Flow and Infiltration, Integrated Modeling of Flow and Contaminant Transport

Eakalak Khan, Ph.D.
University of California, Los Angeles, 1997
Research Interests: Water and Wastewater Quality, Water and Wastewater Treatment, and Storm Water and Non-point Source Pollution

Wei Lin, Ph.D.
SUNY at Buffalo, 1992
Research Interests: Water and Wastewater Treatment, Hazardous Waste Management

G. Padmanabhan, Ph.D.
Purdue University, 1980
Research Interests: Stochastic Hydrology, Water Resource Systems, and Hydrologic Modeling

Robert Zimmerman, Ph.D. (adjunct)
North Dakota State University, 1991
Research Interests: Water and Wastewater Treatment, Solid Waste

Admissions Requirements

To be admitted to the graduate Master of Science program in environmental engineering, the applicant must meet the Graduate School requirements found on page 5.

Financial Assistance

Research and/or teaching assistantships may be available. Applicants are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. To be considered for an assistantship, a completed Graduate School application, official transcripts, and three letters of reference (and TOEFL results for international applicants) must be submitted to The Graduate School. Additional eligibility requirements for teaching assistantships can be found on the Graduate School website.

Degree Requirements

The Master of Science degree thesis a scholarly document prepared by the student which is based on research performed. The research topic is chosen by the student in consultation with his or her adviser. The student and adviser together prepare a plan of study to meet the needs of the individual student. The program contains a minimum of 30 credits of graduate-level material, of which the thesis can count 6 to 10 credits. An overall GPA of 3.0 or better must be maintained. An oral defense of the research-based thesis and comprehensive academic subject matter is required.

A student entering the environmental engineering Master of Science degree program without an undergraduate engineering degree will be required to satisfy the undergraduate requirements for mathematics, basic science, and engineering sciences in addition to the Master of Science requirements.

Family and Consumer Science Education

Program and Application Information

Department Chair:	Dr. William Martin
Graduate Coordinator:	Dr. Mari Borr
Department Location:	School of Education, FLC 210
Telephone Number:	(701) 231-7921
Degrees Offered:	M.S., M.Ed.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Faculty

Mari Borr, Ph.D.
University of North Dakota, 2005
Research Interests:
Qualitative Research, Family and Consumer Science Education, Adolescent Development, Experiential Learning, and Professional Development Evaluation

Program Description

Students have the option of pursuing a Master of Education (M.Ed.) or Master of Sciences (M.S.) degree in Family and Consumer Sciences Education. Advanced work may be taken in FCSE, Career and Technical Education, Extension, and curriculum design and development.

The NDSU programs in education are accredited by National Council for Accreditation of Teacher Education and are approved by the ND Education Standards and Practices Board. Changes in national and state legislation, standards, or rules can affect academic program requirements.

Option A:
This program is designed for a person who already has a bachelor's degree in a Family and Consumer Sciences related area and would like to work toward obtaining a teaching license. Upon completion, the program provides the pedagogy requirements for a Family and Consumer Sciences teaching certificate. Depending on the individual's bachelor's degree, there will most likely be several content courses that will need to be taken as well to meet licensing requirements. Licensing also involves state mandated tests. Student teaching is included in this program. This program is offered through the Great Plains Interactive Distance Education Alliance. All courses in this master's degree are offered online and are taught by faculty at several different universities. For more information, please see: http://www.hsidea.org/programs/fcsed/.

NOTE: Earning an academic/professional degree does not necessarily lead to state credential or licensure. People seeking licensure must provide evidence of the required number of years of teaching or counseling, and, in the case of school administration, administrative experience. Potential and current students should consult with the appropriate academic program coordinator for advice about licensure, certification, or credentialing after communicating with the appropriate state official.

Option B:
This program is designed to provide persons who currently hold a teaching degree in Family and Consumer Sciences with an expanded background in Family and Consumer Sciences Education and related content areas. It also examines the broader field of education, with a solid foundation in research methodology. Students are encouraged to complete additional course work in areas of interest. Internships can be incorporated into the program of study and provide an opportunity for students to examine current issues. Candidates should work closely with an adviser.

Admissions Requirements

Qualified students may apply for admission to graduate programs in the School of Education leading to Master of Education (M.Ed.) or Master of Science (M.S.) degrees.

In addition to the Graduate School's required application materials, the program requires submission of a statement of career goals consistent with the five propositions of the National Board of Professional Teaching Standards NBPTS), http://www.nbpts.org/ as well as reasons for applying to the program. The School of Education reserves the right to obtain additional information about the student's professional competence from qualified professionals.

Admission is considered only after all required application materials have been received and reviewed. Where appropriate, all international student requirements must be met.

Admission decisions are based upon the predicted success of the applicant as a student and professional in the chosen field and are made only after considering all available data. A student must meet all requirements for full admission.

Financial Assistance

Graduate assistantships are available in the School of Education. Applications are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. Students must be accepted into The Graduate School before they are eligible for an assistantship.

Degree Requirements

All enrollments in Education courses before the student files a graduate plan of study must be approved by the adviser. The School of Education will evaluate graduate courses taken prior to filing the graduate plan of study when the student's plan of study is being considered. Only those courses approved by the School of Education may be included on the final plan of study leading to the degree.

Master's programs within the School of Education require a minimum of 30 semester credits (minimums vary by academic program). The Master of Science (M.S.) degree requires a disquisition. The Master of Education (M.Ed.) degree is a non-disquisition, practitioner-oriented degree. Programs vary on requiring a written comprehensive exam or a portfolio/oral.

Food Safety

Program and Application Information

Director:	Dr. Deland J. Myers Sr.
Program Location:	Great Plains Institute of Food Safety 113 Harris Hall
Email:	Deland.Myers@ndsu.edu
Telephone Number:	(701) 231-9450
Degrees Offered:	Ph.D., M.S., Certificate
Application Deadline:	March 15th for fall semester; October 15th for spring semester
Testing Requirements:	GRE
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Faculty

Deland Myers, Ph.D.
Director

Clifford Hall, Ph.D.
Associate Director and Academic Program Coordinator

The Food Safety graduate programs are interdisciplinary and many NDSU graduate faculty participate in advising graduate students in these programs. For more information about faculty involved with these programs and their activities within the Great Plains Institute of Food Safety see www.ndsu.edu/foodsafety or **www.ag.ndsu.edu/foodsystems/**.

Program Description

Background. The lack of individuals with food safety expertise is becoming increasingly evident in government, business, and academia. This food safety expertise gap is widespread and exists in many professions. For these reasons the graduate degrees in Food Safety and the Graduate Certificate in Food Protection were initiated in 2001.

Degrees Offered and the Graduate Certificate The GPIFS offers several programs at the graduate level. Research project based degrees include the Doctor of Philosophy (Ph.D.) and the thesis based Master of Science (M.S.). The thesis based M.S. degree is preparatory for students who may wish to advance to Ph.D. programs. Individuals earning a Ph.D. degree will be educated as independent researchers, expanding their potential to become principal investigators of food safety research in various arenas, including business, academia, and government. The M.S. degree is offered as a thesis based option or a non-thesis option (see Comprehensive Study Option) and will prepare students for supervisory roles in the food industry, in regulatory agencies, or in public health. The Graduate Certificate in Food Protection is aimed at professionals looking to augment their skills, as well as graduate students in other programs wishing to add a credential to their degree programs.

Administration The interdisciplinary Food Safety graduate programs are administered through the GPIFS in the School of Food Systems. The GPIFS is primarily composed of faculty participants from the Colleges of Agriculture, Food Systems, and Natural Resources; Arts, Humanities, and Social Sciences; Engineering and Architecture; Human Development and Education; and Science and Mathematics. The GPIFS graduate students and supervisory committees report to the School of Food Systems Director for program level policies and to the College of Graduate and Interdisciplinary Studies as the academic college.

Admissions Requirements

Admission, Advisor Assignment and Assistantships Admission requirements for the Food Safety programs are based on the minimum NDSU requirements for degree programs and graduate certificates, with additional requirements for the research based degree programs (Thesis based M.S. and Ph.D.) including:

Thesis based M.S.
A relevant baccalaureate degree from an accredited institution of recognized standing. Appropriate degrees might be in food science, food safety, meat science, cereal science, microbiology, veterinary science, economics, engineering, dietetics, nutrition, agricultural policies or communication.

- The Graduate Record Examination General Test scores are required for evaluation purposes. Scores that are lower than the 50th percentile will generally weaken an applicant's chance of being accepted. In all cases, other forms of evidence for academic success will be considered and may supersede the GRE score for evaluative outcomes.

Dissertation Based Ph.D.
A relevant baccalaureate degree from an accredited institution of recognized standing. Appropriate degrees might be in food science, food safety, meat science, cereal science, microbiology, veterinary science, economics, engineering, dietetics, nutrition, agricultural policies or communication. Applicants with a completed M.S. degree (in any related field of study) are generally regarded as more prepared for the Ph.D. program than applicants with only a Bachelors degree.

- For students that have not already completed an M.S. degree at an institution in the United States, the Graduate Record Examination General Test scores are required for evaluation purposes. GRE scores that are lower than the 50th percentile will generally weaken an applicant's chance of being accepted. In all cases, other forms of evidence for academic success will be considered and may supersede the GRE score for evaluative outcomes.

Non-thesis option and Certificate
The non-thesis M.S. option and the Graduate Certificate in Food Protection do not require the GRE.

Applications for summer or fall admittance should be received by March 15. Applications for spring admittance should be received by October 15. The Graduate School does not forward applications for review to the program until the application package is complete. Failure to meet these program deadlines may result in rejection or postponement of admission. Common errors resulting in late applications include missing letters of recommendation and late payment of application fees.

Applications completed by the deadlines are forwarded to the GPIFS Executive Committee for review shortly after the deadline. The committee reviews all applications for acceptability. Applications for research based programs (thesis-M.S. and Ph.D.) are then distributed to faculty to determine tentative advisor placements. Acceptance of the applicant will be judged by a committee of faculty using a combination of factors including those presented above and on applicant's recommendations and statement of purpose. No one faculty member can judge an applicant's qualifications and thus we discourage random request to faculty about their qualifications for entrance into the program. Only prospective students that have submitted an application will be evaluated. Applications for research based programs of acceptable quality may still be rejected if there is not an assistantship available to support the student with, and are therefore the most competitive programs for admission.

Assistantships are reserved for students in the research based programs. Amounts and types of assistantships vary. Research assistantships generally are available through grants obtained by research faculty members and are subject to requirements of the funding source and the NDSU Graduate School assistantship policies. Teaching assistantships are occasionally available to qualified students.

Applications of acceptable quality for the non-research based programs (non-thesis M.S. and Graduate Certificate) will generally be accepted into those programs, unless enrollment caps are being en-

forced. All applicants will be notified about final decisions as soon as possible, however, applicants should understand that processing may take several weeks after the deadlines.

Doctor of Philosophy (Ph.D.)

Requirements The Ph.D. is awarded in recognition of satisfactory completion of advanced studies, written and oral preliminary examinations, performance of novel research in the area of food safety, and development and defense of an acceptable dissertation detailing the student's research. For each doctoral student admitted to the program, an advisory committee will be established. This committee will consist of the major adviser who will chair the committee, and two other selected graduate faculty. Additionally, the Graduate School will appoint an outside member of the committee. The student and major adviser will prepare the plan of study, which is subject to the approval of the committee, the GPIFS director, and the Graduate School dean. The plan of study, which must be filed in the Graduate School, will include not less than 90 semester credits. Fifteen of these credits must be at the 700-789 level. An overall grade point average of 3.0 must be maintained on the required course work.

The plan of study for the Ph.D. will be multidisciplinary. All plans will include sufficient course work to demonstrate a minimum proficiency in food safety. The plan of study should be signed off by the Graduate School by the end of the first semester of enrollment in the program.

Master's of Science (M.S.)

Students may choose a non-thesis M.S. degree or opt for the research-oriented, thesis-requiring program. The non-thesis option is available for students seeking a broad range of knowledge and skills suitable to the workplace. This degree can be obtained by taking a combination of online and on-campus courses or completely online. This degree will not prepare students for careers in research. Students will be required to compose a novel, comprehensive paper, which is a synthesis of the literature regarding some aspect of food safety. The coordinator of the program, under the direction of the Director of the Great Plains Institute of Food Safety and the Advisory Board, will review the student’s choice of courses and progress as outlined in the program requirements. Based on the performance of the student in the required and optional courses and the required paper, the coordinator will approve whether the student has met all the requirements to receive the M.S. degree with final approval by the Graduate School.

The thesis-requiring degree is a research degree and, as such, can prepare the student for future study at the doctoral level. The student will perform a novel research project designed to contribute to the body of knowledge in some area pertinent to food safety, prepare a thesis on this research, and defend it in a final oral examination administered by the advisory committee. The advisory committee will be composed of the major adviser who will chair the examining committee, two additional graduate faculty, and a Graduate School appointee. The student and major adviser, in consultation with the committee, will design the student's plan of study. The plan of study should be signed off by the Graduate School by the end of the first semester of enrollment in the program.

1. Non-Thesis Option: Of the 30 graduate credits required, a minimum of 21 must be in courses approved for graduate credit (601-689 or 700-789). The paper credits must not be fewer than two hours nor more than four. The paper's topic and scope will be determined by the student in consultation with the program coordinator and the Food Safety Master’s Paper Course (Safe 797) instructors who will serve as the student’s advisory committee.
2. Thesis Option: Of the 30 graduate credits required, a minimum of 16 credits must be approved for graduate credit (see above), and thesis credits must not be fewer than 6 nor more than 10 credits. In this case, the student, under the guidance of a major adviser and with the approval of the graduate committee, will perform a novel research project designed to contribute to the body of knowledge in some area pertinent to food safety, prepare a thesis on this research, and defend it in a final oral examination administered by the examining committee.

Graduate Certificate in Food Protection Requirements

To be admitted to this program, students must demonstrate that they have a baccalaureate degree in an area pertinent to food safety from an accredited educational institution of recognized standing. To obtain a Graduate Certificate in Food Protection, students must successfully complete the 9 semester credits of core curriculum (SAFE 601-609). The student must receive a grade of B or better in each course to obtain the certificate.

Genomics and Bioinformatics

Program and Application Information

Program Director:	Dr. Phillip McClean
Program Location:	Plant Sciences, Loftsgard Hall
Email:	Phillip.McClean@ndsu.edu
Telephone Number:	(701) 231-8443
Degrees Offered:	Ph.D. M.S.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

Genomics and Bioinformatics is an interdisciplinary graduate program that involves faculty from nine departments. Advanced research and study will focus on either functional or computation genomics. The program is designed to provide both M.S. and Ph.D. students the necessary skills and intellectual background to work cooperatively with others in a research area that takes a systems-wide approach to the study of the organization and expression of the many genes and their products expressed in an organism. Exposure to modern techniques and instrumentation will prepare the student for success in both industrial and academic careers.

Admissions Requirements

It is the intent of the program to admit students in either of two tracks. The Functional Genomics Track will be for students interested in the generation and application of genomic information. The Computational Bioinformatics Track is intended for students interested in using computer science and statistical approaches to analyze large amounts of genomic data.

The Genomics graduate program is open to qualified graduates of universities of recognized standing. The Graduate School minimum for the TOEFL examination applies. In addition, the following are the requirements to be admitted with full standing.

Functional Genomics Track: a B.S. degree with courses in genetics, physiology, biochemistry; an upper-division statistics class; an introductory biology class emphasizing molecular biology; and minimum undergraduate GPA is 3.0.

Faculty

Eugene Berry, Ph.D.
Northeastern University, 1983
Department: Veterinary and Microbiological Sciences
Research Interest: Animal Virology

Xiwen Cai, Ph.D.
Washington State University, 1998
Department: Plant Sciences
Research Interest: Cytogenetics

Michael J. Christoffers, Ph.D.
University of Missouri-Columbia, 1998
Department: Plant Sciences
Research Interest: Weed Molecular Genetics

Edward L. Deckard, Ph.D.
University of Illinois, Champaign-Urbana, 1970
Department: Plant Sciences
Research Interest: Crop Physiology

Anne Denton, Ph.D.
University of Mainz, 1996
Department: Computer Science
Research Interest: Data Mining, Bioinformatics

Justin D. Faris, Ph.D.
Kansas State University, 1999
Department: Plant Sciences
Research Interest: Wheat Molecular Genetics

Marvin W. Fawley, Ph.D.
Miami University, 1985
Department: Biological Sciences
Research Interest: Evolutionary Biology

David P. Horvath, Ph.D.
Michigan State University, 1993
Department: Plant Sciences
Research Interest: Perennial Weed Physiology

Shahryar F. Kianian, Ph.D.
University of California-Davis, 1990
Department: Plant Sciences
Research Interest: Wheat Molecular Genetics

Phillip E. McClean, Ph.D.
Colorado State University, 1982
Department: Plant Sciences
Research Interest: Plant Molecular Genetics

Computational Bioinformatics Track: a B.S. degree with courses in calculus, comparative computer languages, data structures, an upper-division statistics class, an introductory biology class emphasizing molecular biology, and minimum undergraduate GPA is 3.0

Students can be accepted conditionally into either track without meeting the course or GPA requirements, but will be required to meet those requirements while in residency.

Degree Requirements

Adviser and Graduate Committee:
During the first year, the student will select an adviser, form a graduate committee, and submit the Plan of Study to the Graduate School. The committee must include the student's major adviser, at least one other faculty member of the genomics program, and the Graduate School appointee. For Ph.D. students only, one member of the committee must be from outside the student's home college.

Core Courses

- PLSC 611 Genomics 3 cr
- CSCI/MATH/STAT 732 Bioinformatics 3 cr
- PLSC 721/BIOC 721 Genomic Techniques 2 cr
- 796 Current Topics in Genomics 2 [2 x 1 cr. (MS)] or 3 [3 x 1 cr. (Ph.D.)] cr
- 790 Graduate Seminar 1 (M.S.) or 2 (Ph.D.) cr

Ph.D. Program

Functional Genomics Option

- Ph. D. Core Courses 13 cr
- Support Courses (required unless on incoming transcript) BIOL 659 Evolution 3 cr PLSC 631 Intermediate Genetics 3 cr STAT 726 Applied Regression and Analysis of Variance 3 cr
- Electives minimum of 15 credits from the Physiology, Gene Expression, Genetics and Computational Elective areas; one course from each of the Physiology, Gene Expression, Genetics elective areas is required
- Research to 90 credits total **(NOTE: a minimum of 15 didactic credits must be 700-level courses)**

Bioinformatics Option

- Ph. D. Core Courses 13 cr
- Support Courses (required unless on incoming transcript) CSCI 668 Database System Design 3 cr PLSC 631 Intermediate Genetics 3 cr STAT 661 Applied Regression Models 3 cr CSCI 796 Computational Methods in Bioinformatics 3 cr
- Electives - minimum of 15 credits; a minimum of three courses must be from the Computational area and a minimum of one course must be from either the Physiology, Gene Expression or Genetics Elective areas
- Research to 90 credits total **(NOTE: a minimum of 15 didactic credits must be 700-level courses)**

Steven W. Meinhardt, Ph.D.
University of Illinois, Champaign-Urbana, 1984
Department: Biochemistry and Molecular Biology
Research Interest: Protein Structure/ Function

Kendall Nygard, Ph.D.
Virginia Polytechnic Institute and State University, 1978
Department: Computer Science
Research Interest: Bioinformatics

William Perrizo, Ph.D.
University of Minnesota, 1972
Department: Computer Science and Operation Research
Research Interest: Distributed Database Systems, Centralized Database Systems

Birgit Pruess, Ph.D.
Ruhr- Universitat Bochum, 1991
Department: Veterinary and Microbiological Sciences
Research Interest: Microbial Physiology and Gene Regulation

Jack B. Rasmussen Ph.D.
Michigan State University, 1987
Department: Plant Pathology
Research Interest: Molecular Plant/ Microbe Interactions

Mark Sheridan, Ph.D.
University of California-Berkeley, 1985
Department: Biological Sciences
Research Interest: Control of Growth, Development and Metabolism

Vasant A. Ubhaya, Ph.D.
University of California-Berkeley, 1971
Department: Computer Science and Operations Research
Research Interest: Algorithm Analysis, Operations Research

Elective Areas

Physiology

ARSC 728 Advanced Reproductive Biology 3 cr
BIOC 718 Metabolic Regulation 3 cr
BOT 780 Plant Metabolism and Stress Physiology 3 cr
BOT 784 Photobiology 3 cr
MICR 670 Basic Immunology 3 cr
MICR 680 Bacterial Physiology 3 cr
MICR 781 Advanced Bacterial Physiology 3 cr
PPTH 751 Physiology of Plant Disease 3 cr
ZOO 660 Animal Physiology 4 cr
ZOO 664 Endocrinology 3 cr
ZOO 682 Developmental Biology 3 cr
ZOO 764 Neuroendocrine and Endocrine Systems 3 cr
ZOO 766 Neurophysiology 3 cr

Gene Expression

BIOC 719 Molecular Biology of Gene Expression and Regulation 3 cr
BOT/ZOOL 720 Advanced Cell Biology 3cr
MICR 775 Molecular Virology 3 cr
PLSC 731 Plant Molecular Genetics 3 cr

Genetics

BIOL 659 Evolution 3 cr (required for Functional Genomics Ph.D. Option)
BIOL 796 Molecular Evolution and Phylogenetics 3 cr
MICR 682 Bacterial Genetics and Phage 2 cr
MICR 783 Adv. Bacterial Genetics and Phage 2 cr
PLSC 631 Intermediate Genetics 3 cr (required for Functional Genomics Option)
PLSC 741 Cytogenetics 4 cr
PLSC 751 Advanced Genetics 3 cr
PLSC 780 Population Genetics 2 cr
PLSC 781 Quantitative Genetics 2 cr
PPTH 759 Host-Parasite Genetics 3 cr

Computational

CSCI 724 Survey of Artificial Intelligence 3 cr
CSCI 759 Computational Methods in Bioinformatics 3 cr
CSCI 760 Dynamic Programming 3 cr
CSCI 765 Introduction to Database Systems 3 cr
CSCI 783 Data Mining 3 cr
CSCI 796 Knowledge Discovery in Biological Data 3 cr
CSCI 796 Signal Processing and Analysis in Bioinformatics 3 cr
MATH 635 Mathematical Models of Biological Processes 3 cr
MATH 647 Molecular Topology 3 cr
STAT 650 Stochastic Processes 3 cr
STAT 651 Bayesian Statistical Decision Theory 3 cr
STAT 661 Applied Regression Models 3 cr (required for Bioinformatics Ph.D. option)
STAT 731 Biostatistics 3 cr
STAT 764 Multivariate Methods 3 cr
STAT 796 Computational Statistics 3 cr (required for Bioinformatics Ph.D. option)

M.S. Program -- Thesis Option

Functional Genomics Option

- M.S. Core Courses 11 cr
- Electives- minimum of 9 credits from the Physiology, Gene Expression, and Genetics areas; a minimum of one course must be selected from each of two of these areas
- Research to 30 cr total

Bioinformatics Option

- M.S. Core Courses 11 cr
- Electives - minimum of 9 credits; a minimum of one course must be from the Physiology, Gene Expression or Genetics Elective areas; the remainder of the courses must be from the Computational area
- Research to 30 cr total

M.S. Program -- Comprehensive Study Option

Functional Genomics Option

- M.S. Core Courses 11 cr
- Electives- minimum of 15 credits from the Physiology, Gene Expression, and Genetics areas; a minimum of one course must be selected from each of two of these areas
- Masters Paper to minimum of 30 credit total

Bioinformatics Option

- M.S. Core Courses 11 cr
- Electives - minimum of 15 credits; a minimum of two courses must be from the Physiology, Gene Expression or Genetics Elective areas; the remainder of the courses must be from the Computational area

Masters Paper to minimum of 30 credit total

Examinations

1. **Qualifying Exam (Ph.D. only):** This exam consists of written and oral portions. The student will complete a written exam that emphasizes the application of materials presented in the core courses. The members of the genomics graduate program will submit these questions. The oral exam will be administered by the student's graduate committee and will focus on material beyond the core courses that are specific to the research of the student. Upon completion of the qualifying exam, the student will be accepted as a Ph.D. candidate.
2. **Final Exam (M.S. and Ph.D.):** The final exam will be an oral defense of the student's research results. The student's graduate committee will administer the exam.
3. **Comprehensive Study Option Paper (M.S. only):** M.S. students pursuing the Comprehensive Study Option will be required to complete an in-depth paper of a specific topic relevant to Genomics. The paper will be reviewed and accepted by the student's graduate committee.

Research

The student is required to perform original research in an area of genomics. This will be under the direction of the student's major adviser. To promote cross-disciplinary research, the student is encouraged to collaborate with a student in the other track. This does not apply to M.S. students pursuing the Comprehensive Study Option.

Health, Nutrition and Exercise Science

Program and Application Information

Interim Department Head: Dr. Margaret Fitzgerald

Graduate Coordinator:	Bryan Christensen
Program Location:	Bentson Bunker Fieldhouse
Telephone Number:	(701) 231-5590
Degrees Offered:	M.S., MATrg, Ph.D.
Application Deadline:	Screening of applications will begin March 1 for Fall semester for the options of Exercise/Nutrition Science and Leadership in Physical Education and Sport. Applications for Dietetics accepted for fall, spring, and summer.
Test Requirements: and Dietetics	GRE-Exercise /Nutrition Science Option
English Proficiency Requirements:	TOEFL ibT 100 IELTS 7

Program Description

The Department of Health, Nutrition and Exercise Sciences (HNES) offers graduate study leading to the Master of Science (M.S.) degree in HNES with options in Exercise/Nutrition Science. The HNES department also offers a Master of Science (M.S.) in Dietetics (on line), Master of Science (M. S.) in Advanced Athletic Training and a Master of Athletic Training (MATrg) degree.

Exercise/Nutrition Science Option

The Exercise/Nutrition Science option prepares the graduate for advanced positions with an emphasis in the areas of physical activity, exercise science, nutrition, and health promotion. The department is devoted to researching and understanding the long-term effects of physical activity and nutrition, and translating this research into effective exercise science and wellness programs for children, adolescents, and men and women of all ages. This option is appropriate for athletic trainers, nutrition, and exercise science graduates.

Dietetics (On-line)

Dietetics is one of the most dynamic and versatile of the health-related professions, and this program prepares registered dietitians to practice at an advanced level or pursue doctoral study. The GPIDEA (www.gpidea.org/index.html) Dietetics provides opportunities for registered dietitians and registration-eligible dietetic program graduates to integrate and apply principles from the biomedical sciences, human behavior, and management to design and lead effective food and nu-

Faculty

Thomas C. Barnhart, Ph.D.
University of New Mexico, 1978
Research Interests: Recreation Management, Playground Safety

Ardith Brunt, Ph.D.
Iowa State University, 1999
Research Interests: Nutrition, Gerontology

Bryan Christensen, Ph.D.
University of Kansas, 2000
Research Interests: Biomechanics, Sports Psychology, Strength and Conditioning

Joe Deutsch, Ph.D.
North Dakota State University, 2007
Research Interests: Physical Education Teacher Education; Coaching

Pamela Hansen, Ed.D.
University of South Dakota, 2000
Research Interests: Athletic Training Education, Female ACL injuries, Learning Styles

Kevin Miller, Ph.D.
Brigham Young University, 2009
Research Interests: Exercise Associated Muscle Cramps: Treatments and Pathogenesis, Heat Illness Prevention, Rehydration Strategies for Athletes, Gastric Emptying, Electrolyte and Hydration Balance

Yeong Rhee, Ph.D.
Oklahoma State University, 1999
Research Interests: Trace Elements, Chronic Disease, Immune Function, Functional Foods

Bradford N. Strand, Ph.D.
University of New Mexico, 1988
Research Interests: Physical Education Curriculum and Instruction, Fitness Education, Sport Sociology

Sherri Nordstrom Stastny, Ph.D.
North Dakota State University, 2007
Research Interests: Nutrition, Gerontology

Donna J. Terbizan, Ph.D.
The Ohio State University, 1982
Research Interests: Exercise Physiology, Fitness, Wellness, Exercise Science, Chronic Disease Change

trition programs in a variety of settings. This program is fully online.

In a multi-institution degree program: 1) You apply and are admitted to one university; 2) Enroll in all your courses at that university; and 3) Graduate or receive a certificate from that university. Dietetics graduate candidate must complete a minimum of 36 credit hours to earn a Master of Science degree. Students will complete a six-credit research thesis.

Admissions Requirements

In addition to requirements described under academic information elsewhere in this bulletin, the following criteria will be considered at the time of application for admission into graduate study. Admission to a master's degree program is considered ONLY after all required application materials have been received and reviewed. In order to be considered a student must have a Bachelor of Science degree in an HNES related field from an accredited institution, and an overall undergraduate GPA of 3.0 on a 4.0 scale, and have submitted all required materials as listed.

In addition to the required application materials, the applicant must submit an exhibit of the applicant's written competency through an essay discussing professional philosophy and professional goals.

The Department of Health, Nutrition and Exercise Sciences reserves the right to obtain additional information about the student's professional competence from qualified professionals. Admission decisions are based upon the predicted success of the applicant as a student and professional in the chosen field and are made only after considering all available data.

Financial Assistance

Both research and teaching assistantships may be available. Applications are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. To be considered for an assistantship, a completed Graduate School Application, official transcripts, and three letters of reference must be received by the Graduate School not later than Feb 1. The department admits students for fall semester only. Students are also required to submit a letter of interest and complete a department application for teaching assistantships after they have been accepted into the department as a graduate student. Letters of interest should be submitted to the department Graduate Coordinator. Graduate assistants teach approximately six credits each semester, receive a financial stipend for their work, and a full tuition waiver for fall, spring, and summer semesters. Assistantships are available contingent upon current funding.

Degree Requirements

The Master of Science in HNES requires a minimum of 30 semester credits in Thesis, Comprehensive Study or Field Experience options (see program for requirements).

History

Program and Application Information

Department Head:	Dr. John K. Cox	
Graduate Coordinator:	Dr. Tracey Barrett	
Email:	ndsu.history@ndsu.edu	
Program Location:	Putnam 02	
Telephone Number:	(701) 231-8654	
Degrees Offered:	Ph.D., M.A., M.S.	
Application Deadline:	April 1, for assistantship consideration	
Test Requirements:	GRE	
English Proficiency Requirements	TOEFL ibT	100
	IELTS	7

Program Description

The graduate program in history at North Dakota State University has offered a master's degree program since the Graduate School was founded in 1954. In 2002, a joint program for a Ph.D. in History was instituted between NDSU and the University of North Dakota. A complete program description follows the M.S./M.A. requirements. The graduate faculty also provides instruction to non-history majors in other departments as well as the region's secondary education instructors who require continuing education credits for certification.

The department offers both the Master of Arts and Master of Science degrees in the areas of United States history, modern European history, or world history. Candidates with two years of foreign language study at the baccalaureate level or who have passed a standard foreign language examination meet the requirements for the Master of Arts. Students taking either degree may choose either the thesis or comprehensive study option.

The history graduate program provides a rigorous and highly personalized graduate experience. This experience produces confident people with a sense of achievement. They are ready to contribute as scholars and teachers.

Faculty

Tracy Barret, Ph.D.
Cornell University, 2007
Field: East and Southeast Asia, Overseas Chinese

John K. Cox, Ph.D.
Indiana University, 1995
Field: Eastern Europe, Russia, Germany, Ottoman Empire

Mark Harvey, Ph.D.
University of Wyoming, 1986
Field: American West, Environmental History, Public History

John A. Helgeland, Ph.D.
University of Chicago, 1973
Field: History of Christianity, History of Culture, Roman Empire, Philosophy of History

Thomas D. Isern, Ph.D.
Oklahoma State University, 1977
Field: History and Folklore of the North American Plains, History of Agriculture

Gerritdina Justitz, Ph.D.
University of California--San Diego, 1996
Field: Early Modern Europe, Social and Cultural History of the Reformation

Jim Norris, Ph.D.
Tulane University, 1992
Field: Latin America, Mexico, Spanish Frontier in North America

Larry R. Peterson, Ph.D.
University of Minnesota, 1978
Field: U.S. Intellectual, Women and Families

David Silkenat, Ph.D.
University of North Carolina, 2008
Field: Civil War, Colonial America, Social History

Admissions Requirements (Master's Degree)

The Department of History graduate program is open to qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School admission requirements, the applicant must also

- provide a statement of intent that clearly outlines the applicant's interest and purpose for seeking a master's degree in history. The department uses this statement to assess the applicant's ability to organize thoughts, to formulate a plan of academic study, and to complete the graduate program. This statement also enables the department to determine whether North Dakota State University's graduate history program suits the applicant's needs and objectives.

- Submit a substantial paper submitted for an upper-division history class or for a class in the humanities and social sciences. The paper should provide evidence of an applicant's ability to synthesize information, to organize his/her thoughts logically, and to communicate clearly and effectively.

- Take the general Graduate Record Examinations (GRE) and submit these scores before admission to the program. Students admitted to the program generally score an average of 500 on the verbal and quantitative sections of the GRE's. Students scores on the new analytic writing section should be comparable, i.e. 3.5-4.0. The department requires students whose native language is not English to have a minimum TOEFL score of 600 (paper test) or 247 (computer test).

Financial Assistance

The graduate department has graduate assistantships for qualified students. Assistantships are 10-20 hours/week with graduate tuition waiver. Students wishing to apply for a teaching assistantship should express this in writing to the chair of the department. The deadline for assistantship applications is April 1.

The department awards and renews assistantships based on maintenance of good standing in the program and full-time registration during the appointment, demonstration of historical knowledge and good communication skills, progress towards completion of a degree, interest and potential in teaching as a career, financial need, and minority status in cases of equally qualified candidates.

The department awards assistantships for a one-year (10 month) contract period. It renews these assistantships for one additional year pending the availability of funds, progress toward the completion of a degree, and satisfactory job performance.

Degree Requirements

Thesis Option:
A student selecting the thesis option must complete at least 30 semester credits of graduate work with a minimum of 21 credits in history. Most graduate students in history choose this option. The thesis should reflect original thought and research using primary materials. The department recommends that students intending to continue to a Ph.D. program select this option. Students selecting this track must meet the following requirements:
3 credits, HIST 701 (Methods of Historical Research) taken first semester

6 credits from the following (one to be declared the student's major area and the other the minor area):
HIST 730 Readings in North American History
HIST 760 Readings in European History
HIST 780 Readings in World History

1 credit, HIST 705 (Directed Research) taken during second year
9-12 credits, history course work at 600 level or above
6-9 credits, course work in approved outside field, at 600 level or above
1 written comprehensive exam in student's major area
6-10 credits, HIST 798 (Master's Thesis)
final oral defense

Non-Thesis Option:
Comprehensive Study Option

A student choosing the comprehensive study option must complete at least 30 semester credits of

graduate work with at least 21 credits in history. The student must present three comprehensive study papers. Students write one comprehensive study paper for their major and each of their minor areas of program study. These papers involve substantial research and synthesis in secondary materials. The department does not expect these papers to be original contributions to the world of scholarship, but rather syntheses that demonstrate mastery of particular topics. Students selecting this track must meet the following requirements:

Lesson Plan Option

This option is designed for graduate students who are teachers at the K-12 level, or who plan to be. The number of credit hours and the course requirements are identical to those of the Comprehensive Plan Option. In the Lesson Plan Option, the student prepares three lesson plans in a parallel fashion to the comprehensive study papers (See Comprehensive Study Option above). In addition to the lesson plan, the student needs to reflect on these teaching units and provide an intellectual and pedagogical context for them. This reflection should demonstrate scholarly thinking and effort.

3 credits, HIST 701 (Methods of Historical Research) taken first semester

9 credits, all of the following (one to be declared the student's major area, the others are minor areas):
HIST 730 Readings in North American History
HIST 760 Readings in European History
HIST 780 Readings in World History

6-9 credits, history course work at 600 level or above
6-9 credits, course work in approved outside field, at 600 level or above
1 written comprehensive exam in student's major area
2-4 credits, HIST 797 (Master's Paper)
3 comprehensive study papers
1final oral defense

Suggested Curricula

Year 1-Fall	**Year 1-Spring**
701 Methods of Historical Research	760 Readings in European History or
730 Readings in North American History	780 Readings in World History
600 or 700 level history elective	600 or 700 level history electives
	600 or 700 level approved outside field elective
Year 2-Fall	**Year 2-Spring**
600 or 700 level history elective	760 Readings in European History
600 or 700 level history elective	or 780 Readings in World History
600 or 700 level approved outside field elective	(both required in comprehensive study option)
705 Directed Research (thesis option)	797 Master's Paper or 798 Master's Thesis

Ph.D. in History

The Ph.D. program is jointly conducted by the History Departments of North Dakota State University (Fargo) and the University of North Dakota (Grand Forks). Students should contact the Graduate School on the campus of their choice for application materials.

For more information on this program, please contact at NDSU:

Dr. Mark Harvey,
Professor and Graduate Coordinator
(701) 231-8828
mark.harvey@ndsu.edu

at **UND**:

Dr. Ty Reese,
Associate Professor and Graduate Director
(701) 777-2593
ty_reese@und.edu

Admissions Requirements

Preference for admission into the Ph.D. program with full graduate standing will be given to applicants who have a GPA of at least 3.5 in history courses in an earned bachelor's or master's degree.
Applicants shall submit a statement of intent clearly outlining their research interests, potential major adviser, career goals, and purpose for seeking a Ph.D. in History.
Applicants will submit a substantial paper submitted for a class in History to provide evidence of ability to research thoroughly, to interpret and analyze primary and secondary sources, to synthesize information, to organize thoughts logically, and to communicate clearly and effectively.
The GRE examination is required, and preference for admission into the Ph.D. program with full graduate standing will be given to applicants who score a combined total of 1,000 points on the verbal and analytical sections of the GRE aptitude test.
The program requires a student for whom English is not a native language to have a minimum TOEFL score of 600.

Degree Requirements

Students must satisfactorily complete 90 credits beyond the bachelor's degree. Students entering with an M.A. degree must complete at least 60 additional semester graduate credits. Core course requirements must be met, which include Methods of Historical Research, Historiography, Seminar in the Teaching of History, at least 2 research seminars, and at least 2 readings courses. Students must complete 36 credits with at least 27 credits in History. Students will earn at least 12 credits in one major field. Students must have at least nine hours each in two minor fields; one minor field must be in History.

Students must have a proficiency in two languages other than their native language, or one foreign language and one special research skill such as statistics or computer science.

The program will require at least one academic year in residence at either campus. Students will register at one of the universities that will be the student's academic "home". The student's adviser must be employed at the home university. At least one member of the student's committee must be employed at the other (not home) university. Students will have to take courses at both universities. Students will write three comprehensive examinations in their major and minor fields. The exams will be read and graded by the supervisory committee. Students will complete an oral examination based on the written exams. The oral examination is to be conducted by the supervisory committee.

Students will write a dissertation (up to 24 credits) on an approved topic in consultation with the faculty adviser and the supervisory committee of five faculty. The dissertation must be based on extensive research in primary and secondary sources, must argue an original thesis, and must be defended before the supervisory committee.

The committee will be composed of the faculty adviser who represents the student's field of study and will direct the research and writing of the dissertation. A second member of the

committee (second reader) also represents the student's major field of study. A third member of the committee will represent the student's first minor field of study. The fourth member of the committee represents either the student's major field or second minor field. At least one of the four History faculty must be from the cooperating (non-home) university. The Graduate School will appoint the fifth member of the committee.

Major Fields
Students will be required to write three comprehensive exams in their major and minor (or outside) fields. The exams will be read and graded by the student's supervisory committee. Students will complete an oral examination based on the written exams. The oral examination is to be conducted by the supervisory committee.

Major Fields:	**Minor Fields:**
Great Plains History	Public History
Rural History	World History
North American History	
Western European History	

Residency Requirements

Students enrolled in the Ph.D. program are required to complete at least one academic year (18 credits minimum) in residence at one campus.

Resident students may qualify for teaching assistantships. Students who have completed an M.A. degree may be assigned full responsibility for undergraduate courses or may be assigned to assist a faculty member in teaching courses.

Students will be required to take some courses from faculty at both campuses but will register at only one university. Some courses will be offered by interactive video network; some will be offered through Internet online systems; some courses will require students to travel to the other campus. Students not residing on one of the cooperating campuses will have to have access to a satisfactory research library for various courses and for dissertation research.

Human Development and Family Science

Program and Application Information

Department Head:	Dr. James Deal
Graduate Coordinator:	Dr. Joel Hektner
Department Location:	Evelyn Morrow Lebedeff Hall
Email:	Joel.Hektner@ndsu.edu
Telephone Number:	(701) 231-8268
Degrees Offered:	M.S., Certificate
Application Deadline:	Deadline for Couple & Family Therapy option is Jan 15 and HDFS option is Feb 1, other options are accepted for fall, spring, and summer
English Proficiency Requirements:	TOEFL ibT 100 IELTS 7

Program Description

The department offers graduate study leading to the Master of Science degree with four options: Couple and Family Therapy, Family Financial Planning, Youth Development and Gerontology.

The Couple and Family Therapy (CFT) option is a three-year program, accredited by the Commission on Accreditation in Marriage & Family Therapy Education, designed to train students interested in working in clinical settings as couple and family therapists. This option involves intensive course work and an on-campus practicum the first two years, with thesis work and an off-campus practicum the third year.

The **Family Financial Planning (FFP)** option is a collaborative, inter-institutional program offered through web-based distance education. The FFP option is a 42 credit program with a specific curriculum approved by the Certified Financial Planner (CFP) Board of Standards. The program requires one of the following: practicum, practicum and Master's paper, or a Master's thesis. For students not needing a full Master's degree, a **Graduate Certificate in Family Financial Planning** is also available, with 18 credits of coursework required.

The **Gerontology** option is a collaborative, inter-institutional program offered through web-based distance education. The Gerontology option requires 30 to 33 credits of coursework and a thesis or masters paper for a total of 36 credits. The program can be completed in two to three years. For students not needing a full Master's degree, a **Graduate Certificate in Gerontology** is also available, with 21 credits of coursework required.

The **Youth Development** option is a collaborative, inter-institutional

Faculty

Kristen Benson, Ph.D.
Virginia Polytechnical Institute and State University, 2008
Research Interests: Gender Identity and Family/Partner Relationships, Diversity Issues in Family Therapy, Collaborative Approaches to Family Therapy Education and Training, and Qualitative Methodology

Elizabeth Blodgett Salafia, Ph.D.
University of Notre Dame, 2008
Research Interests: Family and Peer Influences on Adolescents' Disordered Eating Attitudes and Behaviors

Sean Brotherson, Ph.D.
Oregon State University, 2000
Research Interests: Parenting; Family Life Education

Thomas Carlson, Ph.D.
Iowa State University, 2000
Research Interests: Family Therapy Training & Supervision; Fathering

James E. Deal, Ph.D.
University of Georgia, 1987
Research Interests: Personality Development in Children; Research Methods

Margaret Fitzgerald, Ph.D.
Iowa State University, 1997
Research Interests: Birth-timing & Economic Outcomes; The Interface Between Family Business & The Family

Heather Fuller-Iglesias, Ph.D.
University of Michigan, 2009
Research Interests: Social Support and Family Dynamics Across the Lifespan; Psychosocial Aging; Cultural Contexts

Joel Hektner, Ph.D.
University of Chicago, 1996
Research Interests: Alcohol/Drug Abuse Prevention; Delinquency; Peer Affiliation Patterns/ Influences on Behavior

Virginia L. Clark Johnson, Ph.D.
Pennsylvania State University, 1984
Research Interests: Work and Family

Christie McGeorge, Ph.D.
University of Minnesota, 2005
Research Interests: Family Caregiving; Family Wellness; Premarital Counseling

program offered through web-based distance education. The program requires 37 credits, including a Master's paper or thesis. Students can complete the program in two to three years. Youth development is an emerging professional field. It has a positive orientation, meaning its focus is on promoting the positive development of youth, and it is an applied field, with professionals who put developmental research and theory into practice in structuring and implementing programs and services for adolescents.

Admissions Requirements

The Department of Human Development and Family Science graduate program is open to qualified graduates of universities and colleges of recognized standing. To be admitted to the program with full status, the applicant must meet the Graduate School requirements listed on page 5. Students applying for the CFT option must complete the Couple and Family Therapy application. An interview conducted by the CFT faculty to determine readiness for the program will also be required after initial application materials are received. The interview will address professional interests and goals, perceived ability to complete the program, emotional and personal stability, and self-evaluation of clinical skills. Near the end of the first semester after admission, a second interview which focuses on clinical readiness will be conducted prior to admission into the practicum.

Financial Assistance

A limited number of assistantships are available to qualified students with priority given to first year students. Graduate assistants work for a faculty member usually for 10 hours per week. The student receives a full waiver of all tuition, as well as a stipend. To be considered for a departmental assistantship, a student must first make application to the Graduate School and be accepted in full or conditional status. The student must then submit a letter to the HDFS department indicating interest and special skills/experiences that would qualify him/her for an assistantship.

Melissa Lunsman O'Connor, Ph.D.
University of South Florida, 2010
Research Interests: Cognitive and Functional Aging in Healthy and Clinical Populations; Older Drivers; Research Methods; Attitudes toward Dementia

Brandy A. Randall, Ph.D.
University of Nebraska-Lincoln, 2002
Research Interests: Prosocial & Moral Development; Relationships; Positive/Problem Behaviors

Gregory F. Sanders, Ph.D.
University of Georgia, 1983
Research Interests: Later Life Families; Family Strengths

Rebecca Woods, Ph.D.
Texas A&M University, 2006
Research Interests: Perception and cognition in infancy; object processing; multimodal processing; early gender differences

Adjunct

Wendy Troop-Gordon, Ph.D.
University of Illinois, 2002
Research Interests: Peer Relationships in Childhood; Social-cognitive Development; Psycho-social and School Adjustment

Degree Requirements

CFT Option Requirements:

HDFS 701	Graduate Orientation	1
HDFS 703	Research Methods	3
HDFS 705	Quantitative Methods in Developmental Science	3
HDFS 755	Advanced Lifespan Development*	3
HDFS 773	Foundations of Marital & Family Therapy I	3
HDFS 774	Foundations of Marital & Family Therapy II	3
HDFS 775	Clinical Applications in Marital & Family Therapy I	3
HDFS 776	Clinical Applications in Marital & Family Therapy II	3
HDFS 777	Diagnosis & Assessment in Marital & Family Therapy	3
HDFS 790	Special Topics in Clinical Applications	3
HDFS 780	Ethics & Professional Issues in Marital & Family Therapy	3
HDFS 794	Practicum	19

CFT Thesis-based Degree			CFT Non-thesis-based Degree	
HDFS 798	Master's Thesis	6	HDFS 797 Master's Paper	3
			Elective	3
Total 59 credits			**Total 59 credits**	

*Any other 700-level developmental science course may be substituted with adviser and course instructor approval.

FFP Option Requirements:

HDFS 781	Issues and Theories in Family Science	3
HDFS 764	Family Economics	3
HDFS 677	Financial Counseling	3
HDFS 770	Fundamentals of Family Financial Planning	3
HDFS 771	Investing for the Family's Future	3
HDFS 765	Insurance Planning for Families	3
HDFS 766	Estate Planning for Families	3
HDFS 768	Housing/Real Estate	3
HDFS 762	Retirement Planning, Employee Benefits And the Family	3
HDFS 767	Professional Practices in Family Financial Planning	3
HDFS 763	Personal Income Taxation	3
HDFS 769	Financial Planning - Case Studies	3

During the final year of study, students will have a choice of the following requirements:

- Six credits of practicum OR
- Three credits of practicum (HDFS 796) and three credits of Master's paper (HDFS 797) OR
- Six credits of Master's thesis (HDFS 798)

Note: The courses in Insurance, Investment, Personal Taxation, Estate Planning, Retirement and Employee Benefits, and Real Estate and Housing will satisfy the education requirements for students who wish to sit for the Certified Financial Planner exam.

Graduate Certificate in Family Financial Planning Requirements

Financial Planning Option: HDFS 762, 763, 765, 766, 769 and 771

Financial and Housing Counseling: 677, 764, 768, 770, plus 6 credits from 762, 763, 765, 766, 771, 772,781 or 794

Students completing the certificate ***are eligible to sit*** for the CFP. Certification Examination. The CFP Board website at http://www.cfp.net provides information relating to CFP Certification Examination.

Gerontology Option Requirements:

HDFS 790	Perspectives in Gerontology	3
HDFS 660	Adult Development and Aging	3
HDFS 682	Family Dynamics of Aging	3
ADFH 790	Aging and the Environment	3
HDFS 722	Applied Research in Gerontology	3
HNES 652	Nutrition, Health, and Aging	3
HDFS 760	Aging Policy	3
HDFS 790	Professional Seminar in Gerontology	3

During the final year of study, students will have a choice of the following requirements:

A. Six credits of HDFS 798 Master's thesis plus 6 elective credits approved by advisor and committee.
B. Three credits of HDFS 797 Master's paper plus 9 elective credits approved by advisor and committee.
C.

Graduate Certificate in Gerontology Requirements

HDFS 790 Perspectives, HDFS 660, HDFS 722, HNES 652, HDFS 790 Professional, plus two courses from HDFS 760, HDFS 682, or ADFH 790 or from electives approved by advisor and committee.

Youth Development Option Requirements:

HDFS 710	Foundations of Youth Development	1
HDFS 711	Youth Development	3
HDFS 712	Community Youth Development	3
HDFS 713	Adolescents and their families	3
HDFS 714	Contemporary Youth Issues*	3
HDFS 715	Youth in Cultural Contexts	3
HDFS 716	Youth Professionals as Consumers of Research	3
HDFS 717	Program Design, Evaluation, and Implementation	3
HDFS 718	Administration and Program Management	3
HDFS 719	Youth Policy	3

*This course may be taken more than once, as long as the topic areas are different each time.

During the final year of study, students will have a choice of the following requirements:

A. Six credits of HDFS 798 Master's thesis plus 3 elective credits approved by advisor and committee.
B. Three credits of HDFS 797 Master's paper plus 6 elective credits approved by advisor and committee.

Industrial and Manufacturing Engineering

Program and Application Information

Graduate Program Coordinator:	Dr. Om Prakash Yadav	
Interim Department Head:	Dr. Canan Bilen-Green	
Program Location:	202 Civil & Industrial Engineering Bldg.	
Telephone Number:	(701) 231-7285	
Degrees Offered:	Ph.D., M.S.	
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters.	
Test Requirements:	GRE	
English Proficiency Requirements:	TOEFL ibT 81 Speaking 23 Writing 21	IELTS 7.0 Writing 5.5 Speaking 5.5

Program Description

The Department of Industrial and Manufacturing Engineering offers graduate studies at both the Master of Science and Doctor of Philosophy levels. A Master of Science degree may be earned in either Industrial Engineering and Management (IE&M) or Manufacturing Engineering (MfgE). The Master of Science degree can be completed through a thesis option or project option. The project option is available only to candidates who have been professionally employed in industrial engineering, manufacturing engineering or a related field and are working in their field at the time of application for admission to graduate study. The IE&M master's programs is designed to equip students with the ability to analyze, design, and manage industrial and business systems as well as to enable students to develop scholarly abilities to further pursue a Ph.D. degree in industrial and manufacturing engineering. Students have an opportunity to conduct research in the development of theoretical concepts and industrial systems.

For more information about our department and programs please visit our department site at www.ndsu.edu/ndsu/ime/ .

Admissions Requirements

Graduate study in the Industrial and Manufacturing Engineering Department is open to all qualified baccalaureate graduates from universities and colleges of recognized standing. In addition to the GRE test, students must meet the Graduate School requirements found on page 5.

Degree Requirements

The Master of Science degree in Industrial Engineering and Management or Manufacturing Engineering requires 30 credits of graduate-level study. For the thesis option, of the required minimum 30 cred-

Faculty

Canan Bilen-Green, Ph.D.
University of Wyoming, 1998
Research Interests: Quality and Reliability Engineering, Productivity Analysis, Design and Auditing of Quality and Productivity Monitoring Systems, Statistical Modeling and Applications in Industry, Statistical quality control applied to manufacturing, Material strength characterization, Inventory management, and Healthcare

Kambiz Farahmand, Ph.D., P.E.
University of Texas, 1992
Research Interests: Ergonomics Design, Healthcare, Facilities and Production Layout - Planning & Management, Human Exposure and Physiology Simulation, ISO 9001 Quality Management System, Productivity Analysis & Waste Management, Respiratory& Life Support System, Lean Manufacturing, Safety and Human Factors Engineering, Manufacturing Systems, Simulation & Modeling, Operations & Materials Management and Strategic Planning, NanoTechnology, Computer Network Management

Valery R. Marinov, Ph.D.
Technical University of Sofia, 1992
Research Interests: Advanced packaging for flexible microelectronics, laser processing in microelectronics, nanocomposite materials applications.

Jing Shi, Ph.D.,
Purdue University , 2004
Research Interests: Renewable energy development, Wind energy system, Healthcare operation improvement, Healthcare informatics, Wireless sensor network, RFID applications, Micro/ nano manufacturing, Multiscale modeling of manufacturing processes, Composite materials, Microelectronics

David L. Wells, Ph.D., C.Mfg.E.
University of Missouri-Rolla, 1996
Research Interests: Assembly of Micro and Nano Components, Printed Electronics, Process Engineering for Electronics Manufacturing, Advanced Manufacturing Processes, Product Realization, Application of RFID Technology, Quantitative Manufacturing Management, Advanced Manufacturing in Economic Development

its, at least 21 credits must be didactic courses numbered 601-689, 691, 700-789, and 791 while the research credits (798) must be at least 6, but not more than 10, credits. For the comprehensive study option, of the required minimum 30 credits, at least 27 credits must be didactic courses numbered 601-689, 691, 700-789, and 791 while the research credits (797) must be at least 3, but not more than 4, credits.

The Doctor of Philosophy degree requires 60 credits beyond the M.S. requirement. Didactic coursework must account for at least 27 credits, and of these, 15 credits must be earned in 700-level courses. It is customary for the remainder of the didactic credit requirement to be dedicated directly to the dissertation, either through course preparation, focused research or writing.

For either the M.S. or Ph.D., all courses taken outside of the IME Department must be approved in advance by the student's academic adviser. The total course of study must be approved by the student's academic adviser, thesis committee, graduate program coordinator and department chair. Students completing graduate degrees within the IME Department responsibility are expected to exhibit demonstrable expertise in the core competencies of either industrial engineering or manufacturing engineering. Students whose undergraduate major is in another field may be required to include some or all of the core competencies in their graduate coursework. For further information in this regard, please consult the IME Department.

Om Prakash Yadav, Ph.D.
Wayne State University, 2002
Research Interests: Quality and Reliability Engineering; Robust Product/ Process Design, Concurrent Engineering, TQM, Lean Manufacturing, Six Sigma Methodologies, Production & Operations Management, Optimization Techniques, Supply-Chain Management, Fuzzy Logic And Neural Networks, Quantitative Analysis of Operations Management

Jun Zhang, Ph.D.
Purdue University, 2006
Research Interests: Lean manufacturing and logistics, Production planning and inventory control, Scheduling, Simulation optimization, Models and methodologies of stochastic optimization, Healthcare engineering, Facility design, Supply chain management, Artificial intelligence, Machine learning and data mining, Computer integrated manufacturing

All graduate students are required to register for Research Seminar [IME 790] for each semester in residence. This is a one-credit experience for the academic year, but does not count towards the total degree credit requirement. Each new student must complete a preliminary thesis or project proposal within six months of beginning graduate studies, and it is recommended that this be completed during the first semester in residence. The proposal, if approved by the IME Graduate Studies Committee, will provide the direction for the remainder of the student's degree work. At the same time, the student will choose a thesis or project adviser from the IME Department faculty. By the end of the first year in residency, the student must have selected a supervisory committee. This committee will be chaired by the faculty advisor and will provide direction, advice and examination of the student's work and achievement. For additional information, graduate program coordinator.

Financial Assistance

There are a limited number of teaching assistantships in Industrial and Manufacturing Engineering available, which are normally assigned as support for classes with large enrollments and/or heavy laboratory content. Research assistantships are offered when student capabilities and background experience match the needs of the project. While teaching assistantships are funded through the University, research assistantships are generally funded through externally-funded grants and contracts. In both cases, assistantships are considered as employment, and the graduate student should view these appointments as a job. The student's thesis or dissertation may or may not be in the area of their job duties for the assistantship.

Full assistantships are for half-time employment (20 hours per week). Tuition for all graduate credits, resident or nonresident, are waived for individuals officially appointed as research or teaching assistants. Student activity fees are not waived. When a student is offered an appointment as a Graduate Research Assistant, the faculty and the department will carry the expectation that the student has made a full commitment to fulfill both the degree requirements and the job responsibilities.

International Agribusiness

Program and Application Information

Department Chair:	Dr. William Nganje
Graduate Coordinator:	Dr. Gregory McKee
Department Location:	500 Barry Hall
E-mail Address:	ndsu.agribusiness@ndsu.edu
Telephone Number:	(701) 231-7441
Degree Offered:	M.S.
Application Deadline:	March 1 to be considered for an assistantship
Test Requirements	GRE (for assistantship consideration)
English Proficiency Requirements	TOEFL iBT 79 IELTS 6

Program Description

Billions of dollars worth of food and farm products are traded each year on international markets. Food companies scour the globe for customers and suppliers. Policy makers actively promote expanded markets for their country's food producers. Global food and agricultural policies command intense debate in world trade forums. International agribusiness is an exciting and rewarding career!

Entering the world of international agribusiness requires not only a solid educational foundation, but one must also be comfortable with a variety of cultures, have international experience, and demonstrate a desire to learn foreign languages.

The International Agribusiness M.S. program offered by the Department of Agribusiness and Applied Economics at North Dakota State University provides both the academic training and the international experience required to excel in an international agribusiness career. The program of study includes coursework in applied economics, quantitative methods, and international agribusiness strategy, management, finance, and marketing.

The student will participate in an international experience. Three options are available for satisfying the international requirements for the program:

1. The student may participate in an international internship. Both paid and unpaid opportunities exist with international agribusiness companies, with government agencies, or with nonprofit organizations. The semester-long or summer internship can be arranged by the student or in cooperation with NDSU's Office of International Programs. Internship programs will be defined by the student and his or her major adviser, and approved by the Graduate Program Committee (GPC) and the student's supervisory committee.

Faculty

Robert Hearne, Ph.D.
University of Minnesota, 1995
Research Interests: Natural Resource and Environmental Economics

Robert S. Herren, Ph.D.
Duke University, 1975
Research Interests: Economic History, Labor, Money and Banking

Jeremy Jackson, Ph.D.
Washington University in St. Louis, 2008
Research Interests: Microeconomics, Political Economy, Public Finance

Won W. Koo, Ph.D.
Iowa State University, 1974
Research Interests: International Trade, Grain Marketing

Ryan Larsen, Ph.D.
Texas A&M University, 2009
Research Interests: Agricultural Finance, Risk Management

Siew Hoon Lim, Ph.D.
University of Georgia, 2005
Research Interests: Production Economics, Transportation, Industrial Organization

Gregory McKee, Ph.D.
University of California, Davis, 2006
Research Interests: Industrial Organization, Agribusiness, Cooperatives

Dragan Miljkovic, Ph.D.
University of Illinois, 1996
Research Interests: Agricultural Prices, International Trade, Agricultural and Food Marketing and Policy

Frayne Olson, Ph.D.
University of Missouri, 2007
Research Interests: Crop Marketing Strategies, Crop Supply Chain Management, Agricultural Contracting, Agricultural Risk Management

Timothy Petry, M.S.
North Dakota State University, 1973
Research interests: Livestock marketing

Richard Rathge, Ph.D.
Michigan State University, 1981
Research Interests: Demographic Analysis, Labor Force Analysis, Rural Community Research, and Population Impact Assessment

David Ripplinger, Ph.D.
North Dakota State University, 2011
Research Interests: Production Economics and Marketing

2. Students may participate in graduate courses in business or agribusiness at an international university during a semester-long or summer study abroad program. Study abroad programs will be defined by the student and his or her major advisor, and approved by the GPC and the student's supervisory committee.
3. Students may select at least six additional credits of coursework offered at NDSU related to international business or agribusiness. Courses must be approved the student's supervisory committee as part of the student's program of study prior to enrollment in the courses.

Students complete the program by writing and defending their comprehensive study papers under the supervision of their graduate committee.

David Roberts, Ph.D.
Oklahoma State University, 2009
Research Interests: Natural Resource and Environmental Economics, Econometrics, Production Agriculture

David M. Saxowsky, J.D.
The Ohio State University, 1979
Research Interests: Agricultural Law

Saleem Shaik, Ph.D.
University of Nebraska, 1998
Research Interests: Agriculture Policy and Risk Management, Agriculture Production Economics

Cheryl J. Wachenheim, Ph.D.
Michigan State University, 1994
Research Interests: Agribusiness

Tom Wahl, Ph.D.
Iowa State University, 1989
Research Interests: International Marketing and Trade, Agricultural Trade Policy, Marketing and Price Analysis

William W. Wilson, Ph.D.
University of Manitoba, 1980
Research Interests: Commodity Marketing, Agribusiness, Industrial Organization

Admissions Requirements

The Department of Agribusiness and Applied Economics graduate program is open to all qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School's requirements, to be admitted with full status to the program, an applicant must submit GRE scores and have adequate preparation in microeconomic theory, calculus, and statistics.

It is desirable that students begin their program in the fall semester, although students may also begin their programs of study in January. Application for admission to graduate school should be as far in advance as possible, in all cases at least one month prior to the next registration date. International students are advised to submit applications no later than March 31 to ensure VISA documents will be completed for a fall matriculation.

Degree Requirements

Students pursuing a Master of Science in International Agribusiness must complete all core courses. Students select elective courses (with approval of their adviser and supervisory committee) to fulfill the remaining Graduate School credit requirements. The core requirements assure breadth and competence in key areas of knowledge and professional activity. Students participate in an international internship, a study aboard program, or select six additional credits of coursework at NDSU related to international agribusiness. The following courses, or their equivalent, constitute the core of the Master of Science program:

Core Courses:

AGEC 701 Research Philosophy 1 credit
AGEC 741 Advanced Microeconomics 3 credits
AGEC 744 Agribusiness I: Agricultural Product Marketing and Agribusiness Strategy 3 credits
AGEC 746 Agribusiness II: Agrifinance and Commodity Trading 3 credits
AGEC 797 Comprehensive Study 2 to 4 credits

Minimum of 6 credits from:

ECON 610 Introduction to Econometrics
ECON 710 Advanced Econometrics
AGEC 739 Analytical Methods for Applied Economists
AGEC 711 Advanced Topics in Econometrics
Or other approved quantitative coursework.

Approved electives

A minimum of 30 credits is necessary to complete the M.S. in International Agribusiness. Credits beyond those required courses listed above may be met through a combination of internship credits, courses taken during an international study program, or NDSU international courses approved by the student's supervisory committee.

Managerial Logistics

Faculty

See page 152

Program and Application Information

Program Director:	Dr. Denver Tolliver
Assistant to the Director of Educational Programs:	Jody Bohn
Program Location:	Upper Great Plains Transportation Inst.
Email:	Jody.Bohn@ndsu.edu
Telephone Number:	(701) 231-7938
Degree Offered:	M.M.L.
Application Deadline:	May 1 for Fall semester October 1 for Spring semester
English Proficiency Requirements	TOEFL ibT 71 IELTS 6

Program Description

Changing global environments pose great challenges for civilian and military logisticians alike. Response operations require huge amounts of material and personnel delivered in precise quantities and with precise timing. A key to meeting these challenges is a joint interdisciplinary approach to logistics. The Master of Managerial Logistics program targets inspiring logisticians, industry professionals, military officers and DOD civilians who want to meet the transportation challenges of the 21st century. A wide range of career opportunities exists in the transportation industry: civil engineering, plane and ship pilots, bridge designers, transit system managers, railroad engineers, environmental engineers, contract managers, auditors, accountants, biologists, foresters, archaeologists, and many more.

An advanced degree in logistics will help you stand out above others when you begin your career or are advancing your career in the industry. The logistics graduate programs at NDSU will enhance your knowledge, skills, and opportunities for a successful career in the transportation industry. Advance your education and become a leader who sets the industry pace.

Admission Requirements

The Managerial Logistics master's program is open to qualified graduates of universities and colleges of recognized standing. Students must meet the Graduate School requirements found on page 5

Degree Requirements

The Master of Managerial Logistics degree is a non-thesis degree. However, each student must complete a creative component – which will be a transportation and logistical analysis of a chosen county. Case studies may include: (1) comprehensive evaluation of the transportation planning processes, (2) analysis of all intermodal transportation systems, (3) emergency or disaster response case studies or plans, (4) security programs or issues, and (5) recommendations of logistics movements of goods and people throughout the country.

A minimum of 36 credits is required for the Master of Managerial Logistics and can be accomplished in a 12-month period. All 36 credits must be completed using approved courses numbered from 700-789,

and 790. The creative component is the capstone experience, culminating all course material, applications, and research skills together in the Case Studies in Logistics course, offered each summer semester annually. An overall GPA of 3.0 or higher must be maintained.

The Master of Managerial Logistics is an advanced civil schooling resident program which meets all 12 points of the National Logistics Curriculum outlined by the U.S. Army Logistics Management College and is tailored to meet the Department of Defense's strategic goals of joint officer and civilian development and career education. The interdisciplinary nature of the program offers unique training opportunities not found elsewhere.

Coursework

- Enterprise Resource Planning
- Transportation and Logistics
- Crisis Analysis and Homeland Security
- International Logistics Management
- Advanced Supply Chain Planning
- Technology Advances and Logistics
- Organizational Change Management
- Adaptive Planning in Logistics Systems
- Contracting
- Logistics Research Methods
- Military Case Studies in Logistics

Courses

The MML is an interdisciplinary program. All candidates are expected to take the same courses in proper sequence. The expected sequence of courses is shown in Table 1.

Table 1. Expected Sequence of Courses in MML Degree Program

No.	Course Title	Semester
TL 711	Logistics Systems	Fall
TL 715	Enterprise Resource Planning	Spring
TL 719	Crisis Analysis and Homeland Security	Fall
TL 721	International Logistics Management	Fall
TL 723	Advanced Supply Chain Planning	Spring
TL 725	Technology Advances and Logistics	Spring
TL 727	Organizational Change Management	Fall
TL 729	Adaptive Planning in Logistics Systems	Spring
TL 731	Logistics Research Methods	Summer
TL 733	Case Studies in Logistics	Summer
TL 735	Acquisition Contracts: Law/Management	Spring
TL 790	Transportation Graduate Seminar	Fall

Faculty

Magdy Abdelrahman, Ph.D.
University of Illinois-Urbana, 1996
Research Interests: Characterization of Modified Asphalt Binders and Mixes; Pavement Maintenance and Rehabilitation Techniques; Performance-Related Specifications for Pavement Materials; Quality Control and Quality Assurance in Pavement Construction
Department: Civil Engineering

Canan Bilen-Green, Ph.D.
University of Wyoming, 1998
Research Interests: Quality and Reliability Engineering, Design and Auditing of Quality and Productivity Monitoring Systems, Statistical Modeling and Applications, Applied Operations Research
Department: Industrial and Manufacturing Engineering

John Bitzan, Ph.D.
University of Wisconsin-Milwaukee, 1997
Research Interests: Transportation Economics
Department: Management, Marketing and Finance

Jarret Brachman, Ph.D.
University of Delaware, 2006
Research Interests: Al-Qaida Strategy, Counterterrorism, Transportation Security

Robert Hearne, Ph.D.
University of Minnesota, 1995
Research Interests: Natural Resource and Environmental Economics
Department: Agribusiness and Applied Economics

Siew Hoon Lim, Ph.D.
University of Georgia, 2005
Research Interests: Production Economics, Transportation, Industrial Organization
Department: Agribusiness and Applied Economics

Jill Hough, Ph.D.
University of California-Davis, 2007
Research Interests: Public Transportation, Travel Behavior, Built Environment, Accessibility and Mobility of Seniors
Department: UGPTI

Joseph M. Jones, Ph.D.
University of Missouri, 1994
Field: Marketing
Department: Management, Marketing, and Finance

Won Koo, Ph.D.
Iowa State University, 1974
Research Interests: International Trade
Department: Agribusiness and Applied Economics

Brenda Lantz, Ph.D.
Pennsylvania State University, 2006
Research Interests: Commercial vehicle safety systems and analysis, supply chain, intelligent transportation systems for commercial vehicle operations, and statistical modeling and diagnostics.
Department: UGPTI

Subhro Mitra, Ph.D., P.E.
North Dakota State University, 2007
Research Interests: Freight Travel Demand modeling, Urban Travel Demand Modeling, Asset Management and Life-Cycle Cost Study Optimizing Logistics Network, Economic Appraisal of Infrastructure Investment

Peter O'Dour, Ph.D.
University of Missouri-Rolla, 2004
Research Interests: GIS, Groundwater contamination, Remote sensing
Department: Geosciences

Gary R. Smith, Ph.D.
Purdue University, 1986
Research Interests: Quality Control and Systems Applications, Decision Analysis and Modeling Techniques, Safety Performance Measurement and Improvements, Labor Productivity
Department: Deans Office, Engineering and Architecture

Joseph Szmerekovsky, Ph.D.
Case Western Reserve University
Research Interests: Project management and scheduling, Complex systems and flexible manufacturing and using linear and nonlinear dynamic and integer programming and network flows
Department: Management, Marketing and Finance

Denver D. Tolliver, Ph.D.
Virginia Polytechnic University, 1989
Research Interests: Transportation Systems Planning, Freight Transportation, Economic Analysis
Department: UGPTI

Rodney D. Traub, Ph.D.
Purdue University, 1994
Field: Operations Management
Department: Management, Marketing, and Finance

Kim Vachal, Ph.D.
George Mason University, 2005
Research Interests: Policy, Economics, Regional Development
Department: UGPTI

Amiy Varma, Ph.D.
Purdue University, 1993
Research Interests: Transportation Systems and Planning, Traffic Engineering, Airports, and Infrastructure Management
Department: Civil Engineering

Nadim Wehbe, Ph.D.
University of Nevada, Reno, 1997
Research Interests: Reinforced and Prestressed Concrete Structures, Bridge Engineering, Earthquake-Resistant Bridges,
Advanced Composites
South Dakota State University

David L. Wells, Ph.D.
University of Missouri-Rolla, 1996
Research Interests: International Studies in Manufacturing Technology, Strategic Management, Economic Development Strategies
Department: Industrial & Manufacturing Engineering

William W. Wilson, Ph.D.
University of Manitoba, 1980
Research Interests: Commodity Marketing, Agribusiness, Industrial Organization
Department: Agribusiness and Applied Economics

Frank Yazdani, Ph.D., PE
University of New Mexico, 1987
Research Interests: Structural Engineering/Mechanics, Constitutive Modeling of Materials, Damage Mechanics, Plasticity, Computational Plasticity, Finite Elements, Concrete and Masonry Materials
Department: Civil Engineering

Jun Zhang, Ph.D.
Purdue University, 2006
Research Interests: Supply Chain Management, Models and Methodologies of Stochastic Optimization, Lean Manufacturing and Logistics, Healthcare Engineering, Scheduling
Department: Industrial & Manufacturing Engineering

Materials and Nanotechnology

Program and Application Information

Director: Dr. Erik Hobbie
Email: Erik.Hobbie@ndsu.edu
Telephone Number: (701) 231-6103
Degrees Offered: Ph.D., M.S.
Application Deadline: International applications are due May 1st for fall and August 1 for spring and summer. Domestic applicants should apply at least one month prior to the start of classes.
Test Requirements: GRE
English Proficiency Requirements: TOEFL ibT 71
IELTS 6

Program Description

North Dakota State University offers an interdisciplinary program leading to the Master of Science or Ph.D. degree in Materials and Nanotechnology (MNT). The program includes a series of required MNT core courses; additional elective courses; written and oral preliminary examinations; a doctoral dissertation based on independent, original research in the area of materials and nanotechnology; and a final oral examination of the dissertation.

Admissions Requirements

The program in Nanotechnology and Nanomaterials is open to qualified graduates of universities and colleges of recognized standing. Students with a degree in the disciplines of chemistry, engineering, material science and engineering, physics, polymer science, polymer engineering, or related fields will be considered for admission. Applicants must meet the Graduate School requirements found on page 5

Financial Assistance

Students are routinely supported through research assistantships. Applicants are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. All students who submit complete applications by the appropriate deadlines are considered for assistantships. Exceptional students are also eligible for university fellowships that are awarded on a competitive basis.

Degree Requirements

By the end of the first academic year, the student will select an academic adviser from among the MNT faculty and arrange for the appointment of a Graduate Advisory Committee. This committee will consist of at least four members of the graduate faculty. This includes the student's major adviser, at least one additional MNT faculty

Affiliated Faculty

Iskander Akhatov, Ph.D.
Lomonosov University of Moscow, 1983
Research Interests: Fluid Dynamics, Multiphase Systems, Heat and Mass Transfer

Dilpreet Bajwa, Ph.D.
University of Illinois, 2000
Research Interests: Biobased Polymer Composites, Wood Composites, Processing and Characterization, Recycled Materials Utilization, Durability Engineering via Weathering and Degradation Mechanisms

Achintya N. Bezbaruah , Ph.D.
University of Nebraska-Lincoln, 2002
Research Interests: Environmental sensors, Recalcitrant and micro pollutants, Contaminant fate and transport, Small community water and wastewater treatment, Environmental management

Gordon P. Bierwagen, Ph.D.
Iowa State University, 1968
Research Interests: Surface chemistry of coatings materials, corrosion, electrochemistry of coatings, coating lifetime prediction, concentrated random composites

Bret Chisholm, Ph.D.
University of Southern Mississippi, 1993
Research Interests: Combinatorial chemistry methods for coatings, novel organic-inorganic coatings applications, new polyester nanocomposites

Andrew Croll, Ph.D.
McMaster University, Ontario, 2009
Research Interests: Polymers, Diblock Copolymers, Thin Films, Pattern Formation, Mechanics

Stuart G. Croll, Ph.D.
University of Leeds, 1974
Postdoctoral: National Research Council, Canada
Research Interests: Weathering durability of coatings, physical chemistry and suspension stability, pigment-polymer interactions, film formation processes, coating and polymer physics

member, and an appointee of The Graduate School.

The plan of study will be prepared by the student, in consultation with the major adviser, by the end of the first year in residence. The plan shall be approved by the student's Graduate Supervisory Committee, the MNT Program Director, and the Graduate School dean. The plan of study must be filed in the Graduate School prior to scheduling the comprehensive written examination.

Master of Science

Graduate students in Materials & Nanotechnology are able to obtain a Master's degree following one of two different tracks. In each case a total of at least 30 graduate credits with a grade point average of 3.0 or better are required.

The non-thesis option (Master's of Materials and Nanotechnology – Plan B) is appropriate for working professional students or students who are certain that they do not wish to pursue future graduate work in any field of science or engineering to the level of doctorate. In the context of the MNT program, this is the equivalent of a Plan B Master's with a 6-10 credit culminating experience (794) replacing the research credits (798). The thesis option (Plan A) represents a more traditional Master's of Science in Materials and Nanotechnology, with an independent research component in the form of an original thesis that can serve as a foundation for future doctoral work in science or engineering.

For the Thesis Option, of the required minimum 30 graduate credits, at least 16 credits must be from approved graduate courses numbered from 601-689, 691, 700-789, and 791 while the research credits (798) must be not fewer than 6 nor more than 10 credits.

Ph.D.

The Graduate School requires the plan of study for the Ph.D. degree to include not less than 90 semester graduate credits. Of this total, not less than 27 credits must be in courses other than seminar or research credits. Of the 27 course credits, 15 must be at the 700-789 level. The MNT Ph.D. program requires students to complete a series of 7 core courses totaling 17 semester credits. The student will complete additional elective courses to fulfill The Graduate School requirement of 27 semester credits in academic courses. An overall GPA of 3.0 or better must be maintained.

Courses Offered

All students must complete the core curriculum which consists of:

MNT 732	Physical Properties of Materials	3 credits
MNT 729	Materials Characterization	3 credits
MNT 760	Materials Synthesis and Processing	3 credits
MNT 730	Fundamentals of Nanotechnology	3 credits
MNT 756	Molecular Modeling of Materials	3 credits
MNT 745	Preparing Future Researchers	1 credit
MNT 790	Graduate Seminar	1 credit

Alan R. Denton, Ph.D.
Cornell University, 1991
Postdoctoral, University of Guelph, 1991-94; Technical University of Vienna, 1994-95, Research Center Julich, 1996-98
Research Interests: Soft Condensed Matter Theory, Computational Physic

Daniel L. Ewert, Ph.D.
University of North Dakota, 1989
Research Interests: Biomedical Engineering

Victoria Johnston Gelling, Ph.D.
North Dakota State University, 2001
Research Interests: Corrosion control of active metal substrates by environmentally friendly coating, electroactive conducting polymers (ECPs) as corrosion inhibitors, electrochemical experimental techniques for the examination of coated substrates

Thomas Ihle, Ph.D.
Technical University, 1996
Research Interests: Theory and Simulation of Complex Fluids (Colloids, miroemulsions and Biopolymers).

Long Jiang, Ph.D.
Nanyang Technological University, 2003
Research Interests: Polymer and Polymer Composite Processing, Polymer Processing Machinery and Design, Nanocomposites, Polymers and Composites Derived from Biomass, Functional Composites with Novel Microstructures.

Alan R. Kallmeyer, Ph.D.
University of Iowa, 1995
Research Interests: Theoretical, Computational, and Experimental Solid Mechanics, Fatigue and Fracture of Engineering Materials, Composite Materials

Dinesh Katti, Ph.D.
University of Arizona, 1991
Research Interests: Geotechnical Engineering, Constitutive Modeling of Geologic Materials, Expansive Soils, Multiscale Modeling, Steered Molecular Dynamics, Computational Mechanics, Nanocomposite, and Bio-nanocomposites. Computational Biophysics

Students must complete at least an additional 12 credits of graduate level coursework. The courses should be chosen by the students in consultation and with the approval of the student's committee.

Suggested courses include the following

Microelectronics Focus

ABEN 682	Instrumentation and Measurements	3 credits
CPM 796	Supramolecular Chemistry	2 credits
CHEM 766	Quantum Chemistry I	3 credits
CHEM 767	Quantum Chemistry II	3 credits
ENGR780	Electromagnetic Theory	3 credits
ECE 751	Electromagnetic Theory and Applications	3 credits
IME 635	Plastics and Injection Molding Manufacturing	3 credits
IME 627	Electronics Manufacturing	3 credits
IME 720	Surface Engineering	3 credits
MN 735	Optoelectronic Materials Processing	3 credits
PHYS 771	Quantum Physics	3 credits

Biomaterials Focus

ABEN 758	Applied Computer Imaging and Sensing Techniques for Biosystems	3 credits
BIOC 716	Biochemistry of Proteins and Enzymes	4 credits
BIOC 673	Methods of Biochemical Research	3 credits
CE 725	Introduction to Biomaterials: Materials in Biomedical Engineering	3 credits
CPM 771	Methods of Polymer Characterization	3 credits
CHEM 685	Industrial Biotechnology	2 credits
CHEM 665	Principles of Physical Chemistry and Biophysics	3 credits
ECE 685	Biomedical Engineering	3 credits
ECE 687	Cardiovascular Engineering	3 credits
MN 786	Tissue Engineering	3 credits
ME 694	Biomechanics	3 credits
MN 785	Biocompatibility Testing	3 credits
PSCI 611	Pharmacodynamics and Applied Therapeutics	3 credits
PSCI 701	Quantitative Drug Design	2 credits

Nanomaterials Focus

CE 641	Finite Element Analysis	3 credits
CE 783	Nanomechanics	3 credits
CE 793	Environmental Nanotechnology	3 credits
CHEM 766	Quantum Chemistry I	3 credits
CHEM 767	Quantum Chemistry II	3 credits
CPM 673	Polymer Synthesis	3 credits
CPM 686	Corrosion and its Control by Coatings (cross-listed with CHEM)	2 credits
CPM 773	Organic Chemistry of Coatings	3 credits
CPM 782	Physical Chemistry of Coatings	3 credits
CPM 796	Nanomaterials Chemistry	3 credits

Kalpana Katti, Ph.D.
University of Washington, 1996
Research Interests: Advanced Composites, Nanomaterials, Biomaterials, Biomimetics, Materials Characterization and Modeling, Analytical Electron Microscopy, and Microspectroscopy, Bone Tissue engineering

Svetlana Kilina, Ph.D.
University of Washington, Seattle, 2007
Research Interests: Photoexcitation process on the organic-inorganic interfaces in hybrid nanostructures: functionalized carbon nanotubes and quantum dots; Non-adiabatic dynamics in hybrid nanostructures: electron-phonon interactions in ligated quantum dots and functionalized carbon nanotubes; Self-assembly of bio-nanomaterials: structural aspects; Transport properties in amorphous conjugated polymers: effect of structural disorder.

M. Erkan Kose, Ph.D.
University of Florida, 2005; Postdoctoral, Clemson University, 2005-2006; National Renewable Energy Laboratory, 2006-2009
Research Area: Materials Chemistry and Photochemistry

Ivan T. Lima Jr., Ph.D.
University of Maryland, 2003
Research Interests: Photonics

Valery R. Marinov, Ph.D.
Technical University of Sofia, 1992
Research Interests: Process Modeling for Machining, Theory of Metal Cutting, Tribological Coatings, Including Nanocomposite Coatings and Deposition Methods, Design for Composites Manufacturing Processes, Packaging for low-cost disposable microelectronics, Direct-write material deposition methods, Laser processing

Sylvio May, Ph.D.
Jena, 1996
Research Interests: Physics of Lipid Membranes, Biophysics

Seth C. Rasmussen, Ph.D.
Clemson University, 1994
Postdoctoral, University of Oregon, 1995--99
Research Area: Inorganic/Organic Materials Chemistry, Chemical History

IME 720	Surface Engineering	3 credits
ME 682	Fuel Cells	3 credits
ME 733	Nanocomposites and Functionalities	3 credits
ME 734	Smart Materials/Structures	3 credits
ME 712	Advanced Finite Element Analysis	3 credits
PHYS 758	Statistical Physics	3 credits
PHYS 781	Solid State Physics I	3 credits

General Materials Science and Engineering Focus

ABEN 658	Food Process Engineering	3 credits
ABEN 644	Transport Processes in Biological and Environmental Systems	3 credits
ABEN 658	Food Process Engineering	3 credits
ABEN 644	Transport Processes in Biological and Environmental Systems	3 credits
ME 673	Engineering Plastics for Design	3 credits
CE 641	Finite Element Analysis	3 credits
CE 720	Continuum Mechanics	3 credits
CHEM 732	Electrochemistry	3 credits
CHEM 736	Mass Spectroscopy	3 credits
CPM 673	Polymer Synthesis	3 credits
ME 751	Advanced Thermodynamics	3 credits
ME 633	Composites Science and Engineering	3 credits
PHYS 611	Optics for Scientists and Engineers	3 credits
PHYS 781	Solid State Physics I	3 credits

Jing Shi, Ph.D.,
Purdue University, 2004
Research Interests: Microelectronics Packaging, Direct Write Material Depositing, Laser Processing for Electronics, RFID Applications, Numerical Modeling of Manufacturing Processes, Computer Integrated Manufacturing

Wenfang Sung, Ph.D.
Chinese Academy of Sciences, 1995; Postdoctoral, University of Alabama, Birmingham, 1997-1999
Research Area: Organic Materials Chemistry

Chad A. Ulven, Ph.D.
University of Alabama at Birmingham, 2005
Research Interests: Advanced Composites Materials Development, Environmentally Friendly Materials Processing, Nondestructive Evaluation, Impact/ High Strain Rate Characterization of Advanced Materials

Alexander J. Wagner, Ph.D.
University of Oxford, 1997
Postdoctoral MIT, 1998-2000, Edinburgh, 2000-2002
Research Interests: Computational Soft Matter, Phase Separation, Diffusion, Interfaces Physics

Xinnan Wang, Ph.D.
University of South Carolina, 2008
Research Interests: Experimental Biomechanics, Synthesis of Nanomaterials, Nanomechanical Characterization, Nanomanipulation

Dean Webster, Ph.D.
Virginia Polytechnic Institute and State University 1984
Research Interests: Synthesis of high performance polymers, polymerization reactions, crosslinking chemistry, and quantitative structure-property relationship

Xiangfa Wu, Ph.D.
University of Nebraska-Lincoln, 2003
Beijing Institute of Technology, 1998
Research Interests: Nanofabrication and Nanomaterials, Advanced Composites, Fracture and Impact Mechanics

Mathematics

Program and Application Information

Department Chair:	Dr. Dogan Comez
Graduate Coordinator:	Dr. Sean Sather-Wagstaff
Department Location:	412 Minard
Email:	Sean.Sather-Wagstaff@ndsu.edu
Telephone Number:	(701) 231-8171
Degrees Offered:	Ph.D., M.S.
Application Deadline:	March 1 to be considered for assistantships for fall
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

The Department of Mathematics offers graduate study leading to the degrees of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.). Advanced work may be specialized among the following areas:

- algebra, including algebraic number theory, commutative algebra, and homological algebra
- analysis, including analytic number theory, approximation theory, ergodic theory, harmonic analysis, and operator algebras
- applied mathematics, differential equations, dynamical systems,
- combinatorics and graph theory
- geometry/topology, including differential geometry, geometric group theory, and symplectic topology

Beginning with their first year in residence, students are strongly urged to attend research seminars and discuss research opportunities with faculty members. By the end of their second semester, students select an advisory committee and develop a plan of study specifying how all degree requirements are to be met. One philosophical tenet of the Department of Mathematics graduate program is that each mathematics graduate student will be well grounded in at least two foundational areas of mathematics. To this end, each student's background will be assessed, and the student will be directed to the appropriate level of study.

Admissions Requirements

The Department of Mathematics graduate program is open to all qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements on page 5, applicants must have earned a cumulative grade point average (GPA) of at least 3.0 or equivalent in all advanced mathematics courses at the baccalaureate level.

Faculty

Azer Akhmedov, Ph.D.
Yale, 2004
Research Interests: Group Theory, Low Dimensional Topology

Maria Angeles Alfonseca, Ph.D.
Universidad Autonoma de Madrid, 2003
Research Interests: Fourier Analysis, Partial Differential Equations

Nikita Barabanov, Ph.D.
University of Kiev, 1979
Research Interests: Differential Equations, Control Theory, Optimization, Neural Networks

Catalin Ciuperca, Ph.D.
University of Kansas, 2001
Research Interests: Commutative Algebras, Algebraic Geometry

Dogan Comez, Ph.D.
University of Toronto, 1983
Research Interest: Ergodic Theory, Measureable dynamics, Operator Theory

Davis Cope, Ph.D.
Vanderbilt University, 1980
Research Interests: Partial Differential Equations, Numerical Methods, Applied Mathematics

James B. Coykendall, Ph.D.
Cornell University, 1995
Research Interests: Algebraic Number Theory, Commutative Algebra, Ideal Theory, Dimension Theory, Factorization Theory and K-theory

Benton Duncan, Ph.D.
University of Nebraska, 2004
Research Interests: Operator Algebras, Noncommutative Functional Analysis, K-theory

Robert Hladky, Ph.D.
University of Washington, 2004
Research Interests: Sub-Riemannian Geometry

Friedrich Littmann, Ph.D.
University of Illinois, Urbana, 2003
Research Interests: Approximation theory, Number theory

Financial Assistance

Teaching assistantships and a small number of research assistantships are available. Graduate tuition is waived for research and teaching assistants.

All students in full standing and, in certain situations, students in conditional status are eligible for assistantships. International students must show proficiency in reading, writing, and speaking English. In particular, they must pass an oral proficiency interview, which is a Test of Spoken English (TSE) prior to receiving a teaching assistantship. This interview is the culmination of the five-week Intensive English Language Program (IELP) available each summer. An indication, but not a guarantee, of being able to pass this interview is a TOEFL score of at least 600 (paper test) or 247 (computer test). All international students applying from outside the United States for a teaching assistantship must expect to take the IELP.

William Martin, Ph.D.
University of Wisconsin, 1993
Research Interests: Mathematics Education

Sean Sather-Wagstaff, Ph.D.
University of Utah, 2000
Research Interests: Commutative Algebra, Homological Algebra

Warren Shreve, Ph.D.
University of Nebraska, 1967
Research Interests: Graph Theory, Combinatorics, Matrix Theory

Abraham Ungar, Ph.D.
Tel-Aviv University, 1973
Research Interests: Differential Equations, Integral Transforms, Wave Propagation, Special Relativity

Assistantship applications will be considered at any time. However, opportunities are improved for those received by March 1 preceding the fall semester of intended enrollment.

Degree Requirements

At least one year of academic work must be spent in residence at NDSU in fulfilling graduate requirements for each graduate degree earned. The M.S. customarily takes two years to complete: the Ph.D. usually last three years beyond the master's. Students must maintain a cumulative GPA of at least 3.0 throughout their graduate career.

Master of Science
The Master of Science degree is offered in two options: the Thesis Option or the Comprehensive Study Option. The Thesis Option emphasizes research and preparation of a scholarly thesis, whereas the Comprehensive Study Option emphasizes a broader understanding of a major area of mathematics.

Departmental Requirements

1. At least 30 credit hours in approved graduate-level mathematics course work, depending on the degree option. Thesis Option: At least 6 credit hours of Math 798 (Master's Thesis), in addition to at least 18 credit hours in courses numbered 700-789. These 18 credit hours must include six foundational courses. Comprehensive Study Option: At least 2 credit hours of Math 797 (Master's Paper), in addition to at least 24 credit hours in courses numbered 700-789. These 24 credit hours must include six foundational courses as described in Subsection 4.1.Subject to the approval of the Supervisory Committee, at most 6 of the required 30 credits may be earned in 600-level mathematics courses (excluding 620, 621, 650, and 651) or in courses outside the Mathematics Department.
2. A grade of Master's Pass in two of the four written preliminary examinations offered by the department. These examinations are offered in four areas: Algebra, Analysis, Applied Mathematics, and Geometry/Topology.
3. Demonstrated proficiency in a computer programming language.
4. A thesis or expository paper written under the supervision of a faculty member and defended at an oral examination administered by the student's supervisory committee.

Timelines
A candidate has three calendar years from the time of enrollment in the Graduate School to complete

the Master's degree. Extensions may be granted after review and approval by the Graduate Committee, subject to Graduate School Policy.

Doctor of Philosophy

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 prescribed examinations, and the development of an acceptable dissertation covering a significant, original aspect of mathematics.

Departmental Requirements

1. A total of at least 90 credit hours in approved graduate-level mathematics course work, including: (a) At least 42 credit hours in courses numbered 700-789 or as approved by the Graduate Program Director. These 42 credit hours must include six foundational courses as described in Subsection 4.1. The advisor should in consultation with the graduate chair ensure that the 42 credit hours contain a broad spectrum of courses (at least 12 credit hours) outside the student's area of emphasis as well as depth in a specific area of mathematics. (b) At least 3 credit hours of Math 790 (Graduate Seminar). (c) At least 6 credit hours of Math 799 (Doctoral Dissertation). Subject to the approval of the supervisory committee, at most 12 of the required 42 credit hours may be earned in 600-level mathematics courses (excluding 620,621, 650, and 651) or in courses outside the Mathematics Department. Credits used to satisfy the requirements of a Master's degree at NDSU may be included in the 90 credits hours required for the Ph.D. A student entering the Doctoral program with a Master's degree from another institution need only complete 60 credit hours to complete the Ph.D. degree. Half of these 60 credits must be in courses numbered 700-789 excluding those courses numbered 720, 721, 750, and 751.
2. A grade of Ph.D. Pass in two of the four written preliminary examinations offered by the department. These examinations are offered in four areas: Algebra, Analysis, Applied Mathematics, and Geometry/Topology.
3. Demonstrated reading proficiency of mathematical writing in French, German, or Russian. A student's supervisory committee may require a second foreign language.
4. Demonstrated proficiency in a computer programming language.
5. A passing grade in a preliminary oral examination administered by the student's supervisory committee after completion of the Preliminary Examinations.
6. A dissertation consisting of a written presentation of original and significant research completed by the student under the supervision of a faculty member and defended at an oral examination administered by the candidate's supervisory committee.

Timelines

Ph.D. students have 3 years from first enrolling in a 700 level Mathematics course as a graduate student to complete the written Preliminary Examination requirement.

A student advances to candidacy after completion of the preliminary oral examination. All students must advance to candidacy no later than the start of their fourth year in the graduate program of the Department of Mathematics. Extensions may be granted after review and approval by the Graduate Committee, subject to Graduate School Policy.

Mechanical Engineering

Program and Application Information

Department Chair:	Dr. Alan Kallmeyer
Graduate Coordinator:	Dr. Ghodrat Karami
Department Location:	111 Dolve Hall
Email Address:	ndsu.me.gradprogram@ndsu.edu
Telephone Number:	(701) 231-8671
Degrees Offered:	Ph.D., M.S.
Application Deadline:	February 15 for fall semester; September 15 for spring semester. Applications received after the deadline will still be considered, but preference is given to those submitted by the deadline.
Test Requirements:	GRE (International applicants)
English Proficiency Requirements:	TOEFL ibT 79 IELTS 6.5

Program Description

The Department of Mechanical Engineering offers graduate programs leading to the M.S. and Ph.D. degrees. Graduate work may be concentrated in engineering mechanics, fatigue and fracture, biomechanics and biomaterials, thermal engineering, fluid mechanics, energy, controls, and mechatronics, or engineering materials with an emphasis on plastics, composite materials and nanomaterials. Students with a B.S. degree in physics or mathematics may pursue a special graduate program of studies and earn an M.S. degree in Mechanical Engineering.

Admissions Requirements

Admission to the ME program is granted in a competitive process that is based upon consideration of the student's undergraduate GPA, test scores, and area of interest. Students who have graduated from an accredited institution in the United States with a baccalaureate degree in Mechanical Engineering or a closely related field must possess a GPA of 3.0 or greater for consideration of admission at full standing. International students must also provide both TOEFL (or IELTS) and GRE general test scores before their applications will be considered. Minimum requirements for consideration of admission are 79 on the TOEFL ibT or 6.5 on the IELTS, and 300 on the GRE (combined quantitative and verbal).

Faculty

Iskander S. Akhatov, Ph.D.
Lomonosov Moscow State University, 1983
Research Interests: Fluid Dynamics, Multiphase Systems, Micro/Nanofluidics

Fardad Azarmi, Ph.D.
University of Toronto, 2008
Research Interests: Thermal Spray Coatings, Thin Film, Multiscale Engineering Analysis, Finite Element Analysis, Failure in Materials, Corrosion, Materials Characterization, High Temperature Materials, Composite Structures, Metal Foams, Functionally Graded Materials

Dilpreet S. Bajwa, Ph.D.
University of Illinois at Urbana-Champaign, 2000
Research Interests: Biobased Polymer Composites, Wood Composites, Processing and Characterization, Recycled Materials, Utilization, Durability Engineering via Weathering and Degradation Mechanisms

Sherman P. Goplen, Ph.D.
Texas A & M University, 1977
Research Interests: Applied Thermodynamics, Technology Transfer

Alan R. Kallmeyer, Ph.D.
University of Iowa, 1995
Research Interests: Theoretical, Computational, and Experimental Solid Mechanics, Fatigue and Fracture of Engineering Materials, Composite Materials

Ghodrat Karami, Ph.D.
Imperial College of Science and Technology, University of London, 1984
Research Interests: Multiscale Computational Solid Mechanics, Biomechanics, Cellular Mechanics, Micromechanics Characterization of Composites, Continuum Mechanics, Structural Mechanics, Nonlinear and Large Deformation and Analysis, Thermoelastic Analysis

Sumathy Krishnan, Ph.D.
Indian Institute of Technology, 1995
Research Interests: Solar Heating and Cooling, Concentrated Solar Power, Renewable Energy Integrated Systems

Robert V. Pieri, Ph.D.
Carnegie-Mellon University, 1987
Research Interests: Design, Materials and Nanomaterials Characterization, Instructional Pedagogy, Fracture Mechanics, Measurements, Alternative Energy, and Industrial Support

Financial Assistance

Research and/or teaching assistantships may be available to qualified students. Applicants are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. The availability of research and teaching assistantships is contingent upon current funding levels.

Degree Requirements

The minimum total semester credits required for the M.S. degree in Mechanical Engineering is 30. The M.S. degree can be earned with either of two options: the thesis option or the comprehensive study option. With the thesis option, a student must complete a core curriculum of 9 credits (three courses) of graduate courses in mechanical engineering, a master's thesis of 6 to 9 credits of ME 798, and the remaining credits from other approved graduate level courses. At the conclusion of the graduate program, the student will be examined orally on the thesis and coursework. With the comprehensive study option, a student must complete a core curriculum of 9 credits (three courses) of graduate courses in mechanical engineering, a master's paper of no more than 3 credits of ME 797, and the remaining credits from other approved graduate level courses. At the conclusion of the graduate program, the student must pass a comprehensive oral examination on the master's paper and coursework. For more detailed information on the requirements for the M.S. degree, contact the department.

The Ph.D. program requires the completion of 90 credit hours of graduate study beyond the baccalaureate degree (60 credits beyond the M.S. degree). In addition to the credit requirements for the M.S. degree, the Ph.D. degree requires a minimum of 24 course credits and a minimum of 24 credits of research-based dissertation. The remaining 12 credits may consist of any approved graduate level credits. Each student is required to pass a series of written qualifying exams on core subjects within 24 months of enrollment in the Ph.D. program. After the majority of coursework has been completed, an oral preliminary exam will be administered focusing on the student's proposal for the dissertation research. At the conclusion of the Ph.D. program, each student is required to pass a comprehensive oral final examination primarily focused on the dissertation, but which may also cover material from coursework, particularly courses fundamental to the dissertation. For more detailed information on the requirements for the Ph.D. degree, contact the department.

Majura Selekwa, Ph.D.
Florida A&M University, 2001
Research Interests: Robotics, Machine Intelligence, Soft computing Applications, Numerical Methods and Numerical Optimization, Optimal and Robust Control, Smart Actuation Control Systems, Real-Time Control in Mechatronics

Michael Stewart, Ph.D.
University of Illinois, 1979
Research Interests: Computational Fluid Dynamics, Heat and Mass Transfer in Porous Media

Yildirim Bora Suzen, Ph.D.
Wichita State University, 1998
Research Interests: Computational Fluid Dynamics, Aerodynamics, Modeling of Industrial Transport Processes, Transition and Turbulence Modeling, Active/Adaptive Flow Control, Turbo machinery, Multiprocessor CFD

Annie X.W. Tangpong, Ph.D.
Carnegie Mellon University, 2006
Research Interests: Vibrations and Dynamics, Tribology, Friction Damping in Rotating Structures, Friction Damping in Nano- and Biomaterials

Chad A. Ulven, Ph.D.
University of Alabama at Birmingham, 2005
Research Interests: Advanced Composites Materials Development, Environmentally Friendly Materials Processing, Nondestructive Evaluation, Impact/High Strain Rate Characterization of Advanced Materials

Yechun Wang, Ph.D.
University of Maryland, 2007
Research Interests: Microfluidics, Biofluid Mechanics, Computational Fluid Dynamics, Numerical Analysis, and Characterization of Organic Coatings

Xinnan Wang, Ph.D.
University of South Carolina, 2008
Research Interests: Experimental Biomechanics, Synthesis of Nanomaterials, Nanomechanical Characterization, Nanomanipulation

Xiangfa Wu, Ph.D.
University of Nebraska-Lincoln, 2003
Beijing Institute of Technology, 1998
Research Interests: Nanofabrication and Nanomaterials, Advanced Composites, Fracture and Impact Mechanics

Mariusz Ziejewski, Ph.D.
North Dakota State University, 1986
Research Interests: Impact Biomechanics, Human Body Dynamics, Head and Neck Trauma, Impact Trauma, Human Brain Modeling, Statistical Methods

Merchandising

Program and Application Information

Department Head:	Dr. Holly Bastow-Shoop
Graduate Coordinator:	Dr. Linda Manikowske
E-mail:	Linda.Manikowske@ndsu.edu
Department Location:	Evelyn Morrow Lebedeff Hall, EML 178
Telephone Number:	(701) 231-8604
Degrees Offered:	M.S., Certificate
Application Deadline:	Applicants should apply at least two months prior to the start of classes each semester.
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Faculty

Holly E. Bastow-Shoop, Ph.D.
Oklahoma State University, 1981
Research Interests: Global Retailing and Expansion

Ann W. Braaten, Ph.D.
University of Minnesota, 2005
Research Interests: Historical apparel/ textiles, Clothing design, Product development, Women-based business

Jaeha Lee, Ph.D.
University of Minnesota, 2008
Research Interests: Consumer behavior, social responsibility

Linda Manikowske, Ph.D.
Iowa State University, 1993
Research Interests: Retail merchandising, Consumer behavior, Experiential education

Program Description

The Department of Apparel, Design and Hospitality Management offers graduate study leading to the Master of Science degree or a Graduate Certificate in Merchandising in collaboration with the Great Plains Distance Education Alliance (GP-IDEA). The Master's degree in Merchandising is on online program offered through Distance and Continuing Education at NDSU. Participating faculty members from the GP-IDEA have jointly developed the merchandising curriculum. Course are taught by faculty within the Alliance from Kansas State University, North Dakota State University, Oklahoma State University, South Dakota State University, and the University of Nebraska – Lincoln.

The Master's Degree in Merchandising is designed for professionals in a variety of merchandising fields. This program provides students with a global perspective of the interaction of cultural, economic, political, social, and environmental systems as they relate to the industry. In the ever- changing global environment, the ability to merchandise products to the consumer is a strategic advantage, and will distinguish graduates of this program from their peers in the industry. The fully online program allows students to complete coursework while maintaining their professional lives.

Master's Degree Requirements

The 36 credit master's degree program consists of ten required 3-credit courses, listed below, as well as a 6-credit comprehensive project required by North Dakota State University. **Course descriptions and tentative schedules are available at** http://www.ndsu.edu/adhm/graduateprogram.html

Courses are as follows:

- ADHM 710 - Consumer Behavior
- ADHM 720 - Professional Advancement
- ADHM 730 - Product Design, Development and Evaluation
- ADHM 740 - Promotional Strategies in Merchandising
- ADHM 750 - Retail Theory and Current Practice
- ADHM 760 - Historical and Contemporary Issues in Trade
- ADHM 770 - International Retail Expansion
- ADHM 775 - Research Methods in Merchandising
- ADHM 780 - Financial Merchandising Implications
- ADHM 785 - Strategic Planning

Graduate Certificate Requirements

The 12 credit graduate certificate program consists of three required 3-credit courses and one elective 3-credit course, listed below.

Consumer Behavior
Professional Advancement
Retail Theory and Current Practice
Product Design, Development and Evaluation OR Promotional Strategies

Admissions Requirements

Admission decisions are based upon the predicted success of the applicant as a student and professional in the chosen field and are made only after considering all available data. A student must meet all requirements for full admission. The following criteria act as guidelines for full acceptance: A cumulative baccalaureate GPA of 3.0 or better on a 4.0 scale, a GPA of at least 3.25 during the final 30 semester credits of graded undergraduate course work, or a minimum GPA of 3.0 on 10 semester credits of graduate course work.

In completing the application, you are asked to write a statement (500 words or less) identifying and discussing your reasons for applying to this program. Within this statement you are to discuss how learning about diverse perspectives, critical thinking, and effective leadership will enhance your understanding of merchandising.

Recommended skills and academic preparation

Adequate technical skills and access is essential to be successful in an on-line program. Unlimited web access at high speeds is helpful. Word processing programs that are up-to-date are important as is knowledge of writing and publishing programs. Familiarity with diverse learning management systems is helpful. NDSU currently uses Blackboard but other institutions have similar but different programs. An ability to self-motivate and learn independently is necessary for programs where face-to-face interactions are not available.

Financial Assistance

Graduate assistantships are not available since this program is on-line and facilitated through the Great Plains Interactive Distance Education Alliance and Distance and Continuing Education at NDSU. Students who are full time (enrolled for six credits or more) may apply for financial aid.

Music

Program and Application Information

Department Chair:	Dr. John Miller
Graduate Music Coordinator:	Dr. Jo Ann Miller
Department Location:	115 Music Education Bldg.
Telephone Number:	(701) 231-7932
Degrees Offered:	D.M.A., M.M.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Graduate Degrees

Graduate degrees (the Master of Music and the Doctor of Musical Arts) are offered in performance, conducting and music education.

Faculty

Lindsey Bartlett, D.M.A., Lecturer
Jeremy Brekke, D.A., Associate Professor
Andrew Froelich, D.M.A., Professor
Robert W. Groves, Ph.D., Professor
Sigurd Johnson, D.M.A., Associate Professor
Robert J. Jones, D.M.A., Associate Professor
Kyle Mack, D.A., Associate Professor
Jo Ann Miller, D.M.A., Professor
John Miller, Ph.D., Professor
Charlette Moe, D.M.A., Lecturer
Douglas Monroe, D.M.A., Assistant Professor
Katherine Noone, D.M.A., Lecturer
Warren Olfert, Ph.D., Associate Professor
Matthew Patnode, D.M.A., Associate Professor
Virginia Sublett, D.M.A., Professor
Benjamin Sung, D.M.A., Lecturer
Michael Weber, D.M.A., Associate Professor

The Master of Music Degree (M.M.)

Three tracks are offered: Performance, Conducting and Music Education. The Performance, Choral Conducting and Instrumental Conducting tracks require a minimum of 30 credits; the Music Education track requires a minimum of 32 credits.

The M.M. in performance and conducting is the professional degree in music designed for performers and conductors wishing to augment and refine their skills. The M.M. in Music Education is designed for music teachers who wish to update and increase their practical pedagogical knowledge.

Applications may be completed online at www.ndsu.edu/gradschool. A complete application will include three recommendations, transcripts and a scholarly writing example. Applicants should notify the graduate music coordinator, jo.miller@ndsu.edu, of their intention to apply. For applicants in performance and conducting, an on-campus visit and audition are required. Following acceptance into the masters program, applicants will complete a diagnostic exam, which will be used by their advisors to plan appropriate coursework.

All coursework must be passed with a minimum grade of B. Comprehensive written examinations in the student's primary area and in music academic studies must be passed near the end of or after coursework. The final oral examination (administered by the student's committee) occurs after the written comprehensive exam.

Conductors and performers will prepare a recital as their capstone experience. Those in the music education track will complete a written practicum. Both experiences will be planned with guidance by the candidate's committee. The committee will include three graduate faculty members: the advisor, a representative from music academic studies, and at least one other music faculty member.

Master of Music in Performance (Minimum 30 credits)

Course	Course Name	Credits
MUSC 731	Applied Study	8
MUSC 748	Music Bibliography and Research Methods	2
MUSC 780	Recital	4
History/Theory	MUSC 702 Graduate Theory Survey	3
	MUSC 704 Graduate Music History Survey	3
MUSC 721 or 722	Vocal or Instrumental Pedagogy	2-3
MUSC 709	Ensemble Performance	3
MUSC 793	Instrumental Repertoire (Ind. Study) or MUSC 767 Vocal Lit I: Baroque, Classic MUSC 768 Vocal Lit II: Romantic MUSC 769 Vocal Lit III: 20th Century/Contemporary	3
Electives	In consultation with Advisor	1-2
	Total	**Minimum of 30**

Master of Music in Choral Conducting (30 credits Minimum)

Course	Course Name	Credits
MUSC 731	Applied Study	8
MUSC 748	Music Bibliography and Research Methods	2
MUSC 780	Recital	4
History/Theory	MUSC 702 Graduate Theory Survey	3
	MUSC 704 Graduate Music History Survey	3
Literature	MUSC 765 Band Lit: History/Development MUSC 766 Band Lit: Chamber Music	6
MUSC 709	Ensemble Performance	3
MUSC 731	Applied Study	2
	Total Credits	**Minimum of 30**

Master of Music in Instrumental Conducting (32 credits)

Course	Course Name	Credits
MUSC 731	Applied Study	8
MUSC 748	Music Bibliography and Research Methods	2
MUSC 780	Recital	4
History/Theory	MUSC 702 Graduate Theory Survey	3
	MUSC 704 Graduate Music History Survey	3
Literature	Two from: MUSC 760 Medieval/Renaissance Choral Literature MUSC 761 Baroque Choral Literature MUSC 762 Classical/Romantic Choral Literature MUSC 763 Contemporary Choral Literature	6
MUSC 709	Ensemble Performance	3
MUSC 721	Advanced Vocal Pedagogy	2
	Total Credits	**Minimum of 32**

Master of Music in Music Education Degree

This degree is designed to be completed in three summers or in a combination of summers and the academic year. Students must register for a least six credits per calendar year until all degree requirements are completed. Classes are offered both online and on campus. Course-work can be focused in elementary, choral/vocal, or instrumental music education. No thesis is required; rather, students will complete a four-credit practicum. The practicum will be agreed upon and planned jointly by the student and his/her advisor. Comprehensive written examinations must be passed near the end of or after coursework. The final oral examination (administered by the student's committee) occurs after the written comprehensive examination.

Course	Course Name	Credits
Music Education Core (9 credits)		
MUSC 701	Psychology of Music	
MUSC 703	Foundation of American Music Education	
MUSC 790	Seminar in Contemporary Issues in Music Education	
Music Core (10 credits)		
MUSC 702	Graduate Theory Survey	
MUSC 704	Graduate Music History Survey	
MUSC 731	Applied Study	8
Music Electives (9 credits)		
MUSC 713	Advanced Choral Methods	3
MUSC 714	Advanced Elementary Methods	3
MUSC 715	History of Choral Literature	3
MUSC 765	Band Lit: History/Development	3
MUSC 766	Band Lit: Chamber Music	3
	Other Music History, Theory, Literature or Pedagogy (to be determined with advisor)	9
MUSC 794	Practicum	4
	Total Credits	32

Doctor of Musical Arts (D.M.A.)

The 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.

Entering students in the vocal performance track are expected to have appropriate language proficiencies in French, German, and Italian. Remedial work may be required upon recommendation of the adviser and committee.

Recitals and a final written project are planned in conjunction with the candidate's committee, which consists of at least three graduate faculty members: the adviser, a representative from academic studies, and at least one other member at large.

All course work must be passed with a minimum grade of B. Qualifying examinations in the student's primary focus area and in academic studies must be passed near the end of or after course work, and prior to a final oral examination by members of the candidate's committee. All D.M.A. graduates must have reading proficiency in at least one foreign language. For some, an alternative such as a computer language or other research skill, if appropriate to the student's focus area, may be substituted. This proficiency will be determined and assessed by the candidate's committee. Further, students in Choral Conducting must demonstrate appropriate proficiency in foreign language diction.
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 Musical Arts in Performance

Course	Course Name	Credits
MUSC 731	Applied Study	8
MUSC 780	Recital	4
MUSC 789	D.M.A. Thesis	2
History/Theory	To be taken from: MUSC 611 Form and Analysis MUSC 630 Contemporary Harmonic Techniques MUSC 631 Counterpoint MUSC 734 Analytical Techniques MUSC 740 Medieval/Renaissance History MUSC 741 Baroque Music History MUSC 742 Classic Romantic History MUSC 743 Romantic Music History MUSC 744 20th Century Music History	14
Pedagogy	To be taken from: MUSC 721 Vocal Pedagogy MUSC 722 Instrumental Pedagogy MUSC 793 Pedagogy	6
MUSC 709	Ensemble (1,1,1,1,1,1,1,1,1,1)	10
MUSC 793	Instrumental Repertoire (Ind. Study) (3,3,3) or MUSC 767 Vocal Lit I: Baroque, Classic MUSC 768 Vocal Lit II: Romantic MUSC 769 Vocal Lit III: 20th Century/Contemporary	9
Electives	(In consultation with advisor)	9
	Total	**90**

Doctor of Musical Arts in Conducting

Course	Course Name	Credits
MUSC 731	Applied Study	8
MUSC 780	Recital	4
MUSC 789	D.M.A. Thesis	2
MUSC 748	Music Bibliography and Research Methods	2
History/Theory	To be taken from: MUSC 611 Form and Analysis MUSC 630 Contemporary Harmonic Techniques MUSC 631 Counterpoint MUSC 734 Analytical Techniques MUSC 740 Medieval/Renaissance History MUSC 741 Baroque Music History MUSC 742 Classic Romantic History MUSC 743 Romantic Music History MUSC 744 20th Century Music History	14
Literature	MUSC 760 Medieval/Renaissance Choral Lit. MUSC 761 Baroque Choral Literature MUSC 762 Classical/Romantic Choral Literature MUSC 763 Century/Contemporary Choral Literature or MUSC 765 Band Lit: History/Development MUSC 766 Band Lit: Chamber Music	6-12
MUSC 709	Ensemble (1,1,1,1,1,1)	6
Cognate	Courses determined with advisor from Conducting, Music Education, Academic Studies and Performance	14
Electives	(In consultation with advisor)	12
	Total	90

Natural Resources Management

Program and Application Information

Program Director: Dr. Shawn DeKeyser
Program Location: School of Natural Resource Sciences, Hultz Hall-Rm. 163
Email: Edward.Dekeyser@ndsu.edu
Telephone Number: (701) 231-8180
Degrees) Offered: Ph.D., MNRM, M.S.
Application Deadline:
International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements: TOEFL ibT 71, IELTS 6

Program Description

Natural Resources Management (NRM) in the School of Natural Resource Sciences prepares students for the environmental challenges of the 21st century. The Masters of Natural Resources Management (MNRM), Master of Science (M.S.) and the Doctor of Philosophy (Ph.D.) NRM degrees are interdisciplinary curricula offering a broad, systems-based approach toward managing natural resources. NRM graduates are prepared to compete for and be productive in jobs where issues reach beyond a single discipline or subject area. They have the skills necessary to address problems from holistic-ecological and global-social perspectives.

Through the NRM graduate program, students gain a breadth of knowledge in relevant planning, analysis and management areas while developing thorough knowledge in one of the six following specialty areas:

Biotic Resources Science deals with basic scientific principles that govern the interrelationship between biotic (e.g., plants, animals) and abiotic factors (e.g., climate, soils) in major ecosystems and the use of these principles for environmentally sound management of both natural and agro-ecosystems.

Environmental Communication is designed for environmentally oriented students preparing for careers in communications fields such as journalism, public relations, broadcast media and the internet.

Natural Resources Economics prepares students for management, administrative, regulatory, and policy positions that require a broad understanding of natural resources management and allocation.

Physical/Earth Resources Science leads to an understanding of the physical and chemical aspects of ecosystems. Topics of study include hydrology, water management and quality, waste man-

Affiliated Faculty

Allan C. Ashworth, Ph.D.
Professor of Geosciences,
University of Birmingham, 1969

William J. Bleier, Ph.D.
Professor of Zoology,
Texas Tech University, 1975

Francis Casey, Ph.D.
Professor of Soil Science,
Iowa State University, 2000

Gary K. Clambey, Ph.D.
Associate Professor of Botany/Biology
Iowa State University, 1975

Gary A. Goreham, Ph.D.
Professor of Sociology,
South Dakota State University, 1985

Robert Hearne, Ph.D.
Associate Professor of Agricultural Economics,
University of Minnesota, 1995

Mark Andrew Meister, Ph.D.
Associate Professor of Communication,
University of Nebraska, 1997

Jack Norland, Ph.D.
Assistant Professor of Natural Resources Management
North Dakota State University, 2008

G. Padmanabhan, Ph.D.
Professor of Civil Engineering,
Purdue University, 1980

David A. Rider, Ph.D.
Professor of Entomology,
Louisiana State University, 1988

Dean D. Steele, Ph.D.
Associate Professor of Agricultural and Biosystems Engineering
University of Minnesota, 1991

Joseph D. Zeleznik,
Extension Forester,
Michigan State University, 2001

agement, soil properties, energy resources and land-use management.

Pollution Control focuses on the principles and practices of managing natural resources for pollution control. Topics include the technical aspects of pollution as they relate to water, air/solids, earth/soils, and the impact of environmental pollution on the biotic factors.

Social Sciences concentrates on human factors (social, anthropological, political) in environmental management and environmental disaster management, while recognizing constraints and opportunities presented by physical and biological factors.

Within each NRM specialty area are one or more curriculums of study developed in cooperation with the following NDSU academic programs and departments. Students select a curriculum and an adviser from one of these participating units:

- Agribusiness and Applied Economics
- Agricultural and Biosystems Engineering
- Biological Sciences (Botany and Zoology)
- Civil Engineering
- Communications
- Entomology
- Plant Sciences
- Range Sciences
- Earth and Climate Science
- Geosciences
- Soil Science
- Sociology/Anthropology/Emergency Management
- Veterinary and Microbiological Sciences

The educational objective of the NRM graduate program is to provide formal education in a chosen specialty area, introductions to other subject areas, appropriate course work in analytical methods, and research and writing experiences in the general area of environmental management. Problem recognition, definition, analysis and resolution are the ultimate learning objectives.

Admissions Requirements

The graduate program in Natural Resources Management is open to qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements listed on page 5, applicants may be recommended or required to take the GRE general exam. Consult with the NRM Program Director.

Financial Assistance

Both research and teaching assistantships may be available through the participating academic units. Application for financial aid must be made directly to a department. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research. Limited scholarships are available. Contact the NDSU Student Financial Services office for information and applications.

Degree Requirements

To qualify for the M.S. degree, the candidate must satisfactorily complete a minimum of 30 semester units in their selected curriculum, an oral examination and a thesis or comprehensive study paper.
To qualify for the Ph.D. degree, the candidate must satisfactorily complete a course of study of not less

than 90 semester units (including 30 semester units from the M.S. degree or equivalent), both a written and an oral preliminary examination, a research-based dissertation, and an oral defense of the dissertation. In addition, the candidate presents a final public seminar based on the dissertation research.
For more specific information, please refer to the Natural Resources Management Graduate Student Guidelines available on the NRM Web site at www.ag.ndsu.nodak.edu/nrm/

NRM program courses are offered by NRM and the other participating academic units. These include:

Agribusiness and Applied Economics 670, 701, 711, 739, 741
Agricultural and Biosystems Engineering 664, 682, 758, 765
Agricultural Systems Management 654, 675
Anthropology 658, 662, 680
Biology 680, 750, 776, 777
Botany 660, 671, 672, 720, 762, 764, 782
Civil Engineering 610, 621, 672, 673, 677, 678, 679, 768, 770, 775, 776
Computer Science 653, 658, 668, 728, 734, 737, 765
Economics 656, 661, 670, 672, 681, 741, 743
Entomology 610, 731, 732, 742, 750, 765, 770
Communications 636, 642, 643, 700, 711, 725, 755, 767, 785, 786
Geosciences 612, 613, 614, 628, 640, 650
Industrial and Manufacturing Engineering 640, 660
Microbiological Sciences 652, 654, 660, 661, 665, 674, 675, 750, 762, 770, 775, 785
Philosophy 681
Plant Pathology 655, 656
Plant Sciences 653, 665, 686, 724, 734, 753, 763
Political Science 620, 621, 642
Range Science 650, 652, 653, 656, 658, 660, 716, 717, 765
Sociology 603, 605, 610, 612, 613, 620, 622, 631, 639, 643, 645, 665, 700, 701, 723
Soil Science 610, 633, 644, 647, 665, 680, 721, 733, 755, 763, 782, 784
Statistics/Mathematics 660, 661, 662, 663, 725
Zoology 640, 652, 654, 656, 658, 660, 662, 670, 672, 674, 675, 676, 677, 682, 750, 760, 770

Nursing

Program and Application Information

Department Chair:	Carla Gross, Ph.D., RN
Program Location:	136 Sudro
Telephone Number:	(701) 231-5692
Degrees Offered:	FNP/D.N.P., NE/M.S.
Application Deadline:	Doctor of Nursing Practice, February 28 for fall admission. DNP requires a March interview. Nurse Educator: Domestic Applicants: One month prior to start of classes. International Applicants: May 1 for fall and August 1 for spring and summer.
English Proficiency Requirements	TOEFL ibT 71 IELTS 6

Program Description

The Department of Nursing offers graduate study leading to the Master of Science degree. The Doctor of Nursing Practice degree, a clinical doctorate, is also offered in the Family Nurse Practitioner specialty. An individually tailored program of study is available for the advanced practice nurse with a master's degree in nursing.

The program includes advanced nursing courses, support courses, clinical practica and disquisition (comprehensive study or thesis). A master's degree is offered in Nurse Educator.

Guidelines provided by the American Association of Colleges of Nursing (AACN), National Organization of Nurse Practitioner Faculties (NONPF), National Association of Clinical Specialists (NACNS) and American Nurses Credentialing Center (ANCC) are utilized in the curriculum. The graduate nursing program is accredited by the Commission on Collegiate Nursing Education (CCNE).

Faculty

Mykell Barnacle, DNP, FNP
North Dakota State University, 2008

Kara Falk, MS, FNP
University of North Dakota, 2006

Amy Fisher, MA, PNP
College of St Catherine, 1992

Donna Grandbois, Ph.D.
North Dakota State University, 2008

Carla Gross, Ph.D., RN
North Dakota State University, 2012

Dean Gross, Ph.D., FNP
Rush University, 1998

Karla Haug, MS. CNE
North Dakota State University, 2005

Loretta Heuer, Ph.D., FAAN
University of North Dakota, 1995

Norma Kiser-Larson, Ph.D., CNE
University of Minnesota, 1999

Margaret Mackowick, MS
University of North Dakota, 1996

Becky McDaniel, MSN
University of Mary, 2001

Tina Lundeen, DNP, FNP
North Dakota State University, 2010

Molly Secor-Turner, Ph.D.
University of Minnesota, 2008

Jana Stenson, MS
University of North Dakota, 1995

Shila Thompson, Ph.D., RN
South Dakota State University, 2012

Mary Wright, Ph.D.
University of Texas at Austin, 1988

Admission Requirements

1. Baccalaureate degree in nursing from a nationally accredited nursing program.
2. Undergraduate coursework in research and health assessment.
3. Current unencumbered RN licensure
4. Completed application to the Graduate School.
   a. Three references: two from professional colleagues that address clinical competence and potential for graduate education, and one other reference.
   b. Written narrative of professional experience and future goals.
5. Interview, if requested. (Interview required for all FNP applicants.)

Degree Requirements

1. Family Nurse Practitioner/Doctor of Nursing Practice: A minimum of 86 (DNP) semester credits. Nurse Educator: A minimum of 42 (MS) semester credits.
2. A maximum of nine graduate semester credits (with a grade of B or better) completed within seven

years previous to admission, may be transferred from other regionally accredited colleges or universities with the consent of the student's supervisory committee.

3. Dissertation, Clinical Dissertation, or Thesis.

Core Requirements for M.S. and D.N.P. Degrees (11 credits)

NURS 701	Theoretical Perspectives of the Discipline	(3)
NURS 702	Ethics/Policy	(2)
NURS 704	Advanced Nursing Research	(3)
NURS 706	Healthcare Delivery Systems, Financing & Informatics	(3)

M.S. Degree in Nursing

Nurse Educator Requirements (31-34 credits)

NURS 712	Advanced Health Assessment	(3)
NURS 714	Advanced Pathophysiology I	(2)
NURS 715	Advanced Community Assessment	(3)
NURS 716	Advanced Pathophysiology II	(2)
NURS 724	Curriculum Design	(3)
NURS 725	Teaching Strategies	(3)
NURS 726	Education Evaluation	(3)
NURS 728P	Nurse Educator Practicum I	(2)
NURS 729P	Nurse Educator Practicum II	(3)
NURS 731	Advanced Pharmacology I	(2)
NURS 732	Advanced Pharmacology II	(2)
NURS 797/98	Master's Thesis or Comprehensive Project	(4–6)

D.N.P. Degree in Nursing

Family Nurse Practitioner Requirements (DNP) (75 credits)

NURS 710	Health Promotion & Disease Control	(2)
NURS 712	Advanced Health Assessment	(3)
NURS 712P	Assessment Practicum	(6)
NURS 714	Advanced Pathophysiology I	(2)
NURS 715	Advanced Community Assessment	(3)
NURS 716	Advanced Pathophysiology II	(2)
NURS 720	Advanced Practice Roles	(2)
NURS 730	Clinical Applications	(3)
NURS 731	Advanced Pharmacology I	(2)
NURS 732	Advanced Pharmacology II	(2)
NURS 733	Family Primary Care I: Assessment & Management	(3)
NURS 733P	Family Primary Care: Residency I	(8)
NURS 734	Family Primary Care II: Assessment & Management	(3)
NURS 734P	Family Primary Care: Residency II	(8)
NURS 735	Family Primary Care III: Assessment & Management	(2)
NURS 735P	Practicum IV: FNP Role Integration	(4)
NURS 736P	Practicum V: FNP Role Integration	(7)
PHARM 685	Economic Outcomes Assessment	(2)
STAT 725	Applied Statistics	(3)
NURS 799S-1	Clinical Dissertation I: Development of a Comprehensive Study	(2)
NURS 799S-2	Clinical Dissertation II: Implementation of a Comprehensive Study	(2)
NURS 799S-3	Clinical Dissertation III: Evaluation of a Comprehensive Study	(2)
One 2 credit elective		

Pharmaceutical Sciences

Program and Application Information

Department Chair:	Dr. Jagdish Singh
Department Location:	102 Sudro Hall
Telephone Number:	(701) 231-7661
Degree Offered:	Ph.D.
Application Deadline:	March 15 for fall semester and November 15 for spring semester, if positions are available.
Test Requirements:	GRE (300 or more)
English Proficiency:	TOEFL ibT 79
Requirements	IELTS 6

Program Description

The Department of Pharmaceutical Sciences offers graduate study leading to the Doctor of Philosophy degree. Advanced work may be selected from pharmaceutics, pharmacokinetics, pharmacology, and medicinal chemistry.

The pharmaceutical sciences curriculum consists of a core of courses involving both basic and pharmaceutical sciences. In addition, students will select courses that will prepare them to be competent scientists in their fields.

Admissions Requirements

The Department of Pharmaceutical Sciences graduate program is open to all qualified graduates of recognized universities and colleges. In addition to the Graduate School requirements listed on page 5, the applicant must have adequate preparation in pharmacy or a biological or physical science related to pharmaceutical sciences.

Financial Assistance

A limited number of assistantships is available. To be considered for an assistantship, the student must have completed a Graduate School application, be accepted by the department, and submit a formal letter to the department chair requesting an assistantship.

Degree Requirements

The Doctor of Philosophy program requires the completion of 30 semester credits of letter-graded course work with a GPA of 3.0 or better. Out of the 30 credits at least 18 credits must be at 700 level. Candidates defend their dissertations. Candidates for the Ph.D. will be required to take an examination directed at determining competency in the pharmaceutical sciences.

The department requires the following core courses:
PSCI 611 Pharmacodynamics and Applied Therapeutics I
PSCI 670 Pharmacokinetics
PSCI 790 Graduate Seminar
BIOC 701 Comprehensive Biochemistry I
BIOC 702 Comprehensive Biochemistry II
STAT 725 Applied Statistics

Faculty

Bin Guo, Ph.D.
State University of New York at Buffalo, 1999
Postdoctoral: Burnham Institute, La Jolla, CA. 1999 - 2003
Research interests: Molecular and cell biology of apoptosis; cancer pharmacology

Yagna Jarajapu, M.Pharm., Ph.D.
University of Strathclyde, 1998
Glasgow Caledonian University, 2002
Postdoctoral: University of Florida, and Wake Forest University 2003-2008
Research Interests: ACE2/Angiotensin-(1-7) and Bone Marrow Progenitor Cells in Diabetes

Benedict Law, Ph.D.
University of Manchester, 2002
Postdoctoral : Massachusetts General Hospital/Harvard Medical School, 2002 -2007
Research Interests: Drug delivery, imaging, and nanotechnology

Estelle Leclerc, Ph.D.
University Paris XI, 1994
Postdoctoral: ETH-Zurich (Switzerland): 1994-1998 The Scripps Research Institute (La Jolla, CA): 1998 -2003 Junior Group Leader Children's Hospital Zurich (Switzerland): 2004
Research Assistant Professor Florida Atlantic University (FL): 2005-2009
Research Interests: Biopharmaceutics

Sanku Mallik, Ph.D.
Case Western Reserve University, 1992
Postdoctoral: California Institute of Technology, 1993-95
Research Interests: Synthetic medicinal chemistry

Stephen T. O'Rourke, Ph.D.
University of Wisconsin, 1985
Postdoctoral: Mayo Clinic and Foundation, 1985-87
Research Interests: Vascular Pharmacology

Steven Qian, Ph.D.
The University of Iowa, 1999
Postdoctoral: National Institute of Environmental Health Science (NIEHS, NIH) 2000-2004
Research Interests: Roles of lipid-derived and protein-derived free radical metabolites in all kinds of health related problems

R. Craig Schnell, Ph.D.
Purdue University, 1969

Jagdish Singh, Ph.D.
Banaras Hindu University, 1982
Postdoctoral: University of Otago, New Zealand, 1985-88; University of California--San Francisco, 1992-94
Research Interests: Novel Dosage and Drug Delivery Systems, Biopharmaceutics

Kristine Steffen, Pharm.D., Ph.D.
North Dakota State University, 2002
North Dakota State University, 2007
Postdoctoral: Neuropsychiatric Research Institute, 2007-2009
Research Interests: Pharmacokinetics, Bariatric Surgery, Eating Disorder and Obesity Pharmacotherapy

Chengwen Sun, M.D., Ph.D.
Norman Bethune University of Medical Sciences, 1983-1988
Immunology, Norman Bethune University of Medical Sciences, China, 1990-1996
Postdoctoral: Department of Physiology, Medical College of Wisconsin, 1996-2000
Research Interests: Central blood pressure control and hypertension gene therapy

Stefan Vetter, Ph.D.
Swiss Institute of Technology (ETH) Zurich,1998
Postdoctoral: The Scripps Research Institute, La Jolla, 2000-2005
Research Interest: Medicinal Protein Biochemistry

Erxi Wu, Ph.D.
Sheffield University, 1998
Postdoctoral: Dana-Farber Cancer Institute/Harvard Medical School, 1998-2004 Faculty: Children's Hospital Boston/Harvard Medical School, 2005-2008
Research Interests: Cancer therapeutic targets, drug discovery, natural products, blood biomarker for cancer

Physics

Program and Application Information

Department Chair:	Dr. Daniel Kroll
Graduate Coordinator:	Dr. Alexander Wagner
Department Location:	218 South Engineering
Telephone Number:	(701) 231-8974
Degrees Offered:	Ph.D., M.S.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
Test Requirements	GRE required, subject strongly recommended
English Proficiency Requirements	TOEFL ibT 79 (GRA), 81 (GTA) IELTS 6 (GRA), 7 (GTA)

Program Description

The Department of Physics offers graduate study leading to the M.S. and Ph.D. degrees. Advanced work may involve specialized training in the following areas: biophysics, computational physics, condensed matter, laser applications, optics, chemical physics, soft matter, statistical mechanics, physics education and polymer physics.

Research and academic programs are tailored to meet individual needs and interests. Soon after their arrival, new students are strongly urged to visit faculty members to discuss research opportunities.

Admissions Requirements

The Department of Physics graduate program is open to all qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements listed on page 5, the applicant must have earned a cumulative grade point average (GPA) in all courses of at least 3.3 or equivalent at the baccalaureate level.

Financial Assistance

The student must apply to the Graduate School and be accepted in full or conditional status before being eligible for an assistantship in the Department of Physics.

Faculty

Landon Bladow, Ph.D.
North Dakota State University, 2009
Research Interests: Theoretical Chemical Reaction Dynamics, Quantum Chemistry

Warren Christensen, Ph.D.
Iowa State University, 2007
Research Interests: Physics Education Research, Student Content Understanding, Curriculum Development

Andrew Croll, Ph.D.
McMaster University, 2009
Research Interests: Polymers, Diblock Copolymers, Thin Films, Pattern Formation, Mechanics

Alan R. Denton, Ph.D.
Cornell University, 1991
Postdoctoral: University of Guelph, 1991-94; Technical University of Vienna, 1994-95, Research Center Julich, 1996-98
Research Interests: Soft Condensed Matter Theory, Computational Physics

Eric Hobbie, Ph.D.
University of Minnesota, 1990
Research Interests: Nanotechology, Nanoparticles, Polymers, Optics and Rheology

Thomas Ihle, Ph.D.
Technical University, Aachen, 1996
Postdoctoral: University of Paris, 1995-96; Grenoble 1997; University of Minnesota 1998-2000
Research Interests: Theory and Simulation of Complex Fluids Kinetic Theory, Pattern Formation

Daniel M Kroll, Ph.D. Department Head,
University of Chicago, 1973
Research Interests: Theoretical and Computational Modeling of Complex Fluids and Biomembranes

Mila Kryjevskaia, Ph.D.
University of Washington, 2008
Research Interest: Physics Education

Sylvio May, Ph.D.
Friedrich-Schiller University, 1996
Research Interests: Physics of Lipid Membranes, Biophysics

Orven Swenson, Ph.D.
Air Force Institute of Technology, 1982
Research Interests: Laser materials processing, optics education

Generally, graduate students are supported during the academic year by either teaching assistantships or research assistantships. The 2007-2008 academic year stipend was approximately $14,000 for 9 months. Additional support during the summer is also possible. Graduate tuition (except for student activity fees) is fully waived for all teaching assistants and research assistants.

Degree Requirements

Master of Science

The Graduate Advisory Committee shall assign to each incoming graduate student a temporary advisor, who shall assist in the selection of courses. By the end of the second semester, the student must choose a permanent advisor, who will guide the student in research, and establish an advisory committee.

Each student must earn at least 30 graduate credits, numbered 601-798, of which:

- at least 10 credits are Physics courses numbered 601-689 or 700 -789;
- at least 16 credits are didactic courses numbered 601-689 or 700 -789;
- between 6 and 10 credits are Physics 798 (Master's Thesis);
- at least one credit must be Physics 790 Graduate Seminar.

IMPORTANT NOTE: Non-terminal Master's students who intend to pursue a PhD require 12 or more credits from Physics courses numbered 700-789.

Students are required to attend all seminars and colloquia. Each student must complete a plan of study soon after beginning thesis research. The student and advisor must agree upon two additional members of the Advisory Committee (in addition to the advisor). One additional member from outside the Physics Department will be appointed by the Graduate School, but suggestions can be made by the candidate.

Doctor of Philosophy

The Ph.D. program requires the completion of at least 90 graduate credits, numbered 601-799. Credits used to satisfy the requirements for the M.S. degree may be included in the total:

- 27 or more must be in letter-graded courses
- 19 are the required physics courses (655, 752, 758, 761, 771, 781, and 790)
- No more than 12 credits are in non-physics courses

By the end of the first year the student must select a graduate advisor and a thesis topic. At this point the student must submit a plan of

Alexander J. Wagner, Ph.D.
University of Oxford, 1997
Postdoctoral
:MIT, 1998-2000, Edinburgh, 2000-2002
Research Interests: Computational Soft Matter , Phase Separation, Diffusion, Interfaces Physics

Emeritus

Ghazi Q. Hassoun, Ph.D.
University of Minnesota, 1963
Postdoctoral: University of Michigan, 1963-65
Research Interests: Foundations of Quantum Mechanics

Charles A. Sawicki, Ph.D.
Cornell University, 1975
Postdoctoral; Cornell University, 1975-79
Research Interests: Acoustics, Biophysics, Geophysics

Mahendra K. Sinha, Ph.D.
Pennsylvania State University, 1961
Postdoctoral: National Research Council (Ottawa), 1964-66
Research Interests: Field Emission and Field-Ion Microscopy

Adjunct

Stuart Croll, Ph.D.
University of Leeds, UK, 1974
Research Interests: weathering durability, film formation, internal stresses in films, modern art conservation, and history of paint technology

Andrei Kryjevski, Ph.D.
University of Washington, 2004
Research Interest: High Energy Partical Theory, Nuclear Theory, First-Principles Numerical Techniques for Fermi Systems

Kenneth Lepper, Ph.D.
Oklahoma State University, 2001
Research Interests: Applied Solid state physics (geologic materials) and materials characterization

Konstantin Pokhodnya, Ph.D.
Morcow Institute of Science and Technology, 1977
Research Interests: materials, thin film fabrication, spintronics

Gary D. Withnell, Ph.D.
North Dakota State University, 1980
Research Interests: Biophysics

study. The student and advisor must nominate two additional members for the Ph.D. committee. One additional member will be appointed by the Graduate School. One person on the committee must be from outside department.

Comprehensive examination: in the second half of their second year students

- hand in a report that summarizes their research results so far and details a research plan for the rest of their research work
- give a talk about their research topic;
- after their talk, an oral examination by their thesis committee has to be passed to confirm their doctoral status. This confirmation is a prerequisite for graduation.

If the student fails the comprehensive examination, she/he will be given the opportunity to repeat the examination in the next semester (this examination can be repeated only once). Alternatively, the student may elect to work for a Master's degree instead.
Students should submit their doctoral thesis for examination at the end of their fourth year.
For the comprehensive and final examinations, students must submit the appropriated forms to the Graduate School.

Research Equipment

The following equipment is available for research: global positioning system, picotesla magnetometry equipment, work stations; computer clusters, resources at the NDSU Center for High-Performance Computing; Nd:YAG , and titanium: sapphire lasers; immediate access to scanning electron microscope; low- and high-field NMR; and X-ray powder diffractometer, materials processing lasers and a full complement of materials characterization equipment through the NDSU Center for Nanoscale Science and Engineering.

Plant Pathology

Program and Application Information

Department Chair: Dr. Jack Rasmussen
Department Location: Walster Hall
Telephone Number: (701) 231-8362
Degrees Offered: Ph.D., M.S.
Application Deadline: International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.

English Proficiency Requirements: TOEFL ibT 79, IELTS 6

Program Description

The Department of Plant Pathology offers graduate study leading to the M.S. and Ph.D. degrees. Advanced degrees may involve specialized training in the following areas: host-parasite genetics, molecular biology and genomics, epidemiology, tissue culture, soil and seedborne diseases, microbial ecology, and integrated disease management.

Student research and academic programs are tailored to individual needs and interests.

Five graduate faculty members are housed in the Northern Crops Science Laboratory located on campus. This relationship provides additional opportunities for research and consultation.

Admissions Requirements

The Department of Plant Pathology graduate program is open to all qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements listed on page 5, the applicant must **h**ave adequate preparation in Plant Pathology or Biology.

Financial Assistance

Research assistantships and part-time positions are available in the department. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research. To be considered for an assistantship, a completed Graduate School application, official transcripts, and three letters of reference must be submitted. In addition to these materials, international applicants must also

Faculty

Maricelis Acevedo, Ph.D.
University of Nebraska-Lincoln, 2007
Research Interests: Rust-pathogen's Virulence Evolution, Host Resistance, Pathogen Population Diversity

Robert Brueggeaman, Ph.D.
Washington State University, 2009
Research Interests: Barley Disease Resistance Gene Characterization and Deployment, Molecular Mechanisms of Host-Pathogen Interactions

Luis del Rio, Ph.D.
Iowa State University, 1999
Research Interests: Epidemiology of Plant Diseases, Chemical and Biological Control of Fungal Diseases, Management of Canola Diseases

Samuel Markell, Ph.D.
University of Arkansas, 2007
Research Interests: Extension Plant Pathology, Rust Diseases, IPM, Emerging Diseases, Chemical Control

Neil C. Gudmestad, Ph.D.
North Dakota State University, 1982
Research Interests: Ecology and Epidemiology of Plant Pathogenic Bacteria, Foliar Diseases of Potato

Mohamed Khan, Ph.D.
Clemson University, 1998
Research Interests: Sugarbeet Management

Zhaohui Liu, Ph.D.
North Dakota State University, 2006
Research interests: Molecular biology and genetics of host-pathogen interactions in wheat leaf spot diseases

Steven W. Meinhardt, Ph.D.
University of Illinois, 1984
Research Interests: Structure/Function Relationships in Enzymes and Toxins

Berlin D. Nelson, Ph.D.
Washington State University, 1979
Research Interests: Oilseed Diseases, Biological Control, Mycology

Jack B. Rasmussen, Ph.D.
Michigan State University, 1987
Research Interests: Molecular Biology and Role in Disease of Pathogen-Produced Toxins, Genetics of Resistance to Cereal Rust Diseases

submit TOEFL scores. These items must be submitted to The Graduate School.

Degree Requirements

The program generally requires a minimum of two years of full-time study for the M.S. degree and three years of full-time study for a doctorate, during which an overall GPA of 3.0 or better must be maintained.

For M.S. candidates, an oral defense of a research-based thesis or paper, and academic subject matter is required. Candidates for the Ph.D. will be required to pass a preliminary written and oral examination covering academic subject matter and a final oral defense of a research-based dissertation. Programs of study are developed to meet both disciplinary requirements as well as special interests of the students.

Gary A. Secor, Ph.D.
University of California-Davis, 1978
Research Interests: Potato Diseases Management and Control, Biotechnology for Cultivar Improvement

Julie Sherman Pasche, Ph.D.
North Dakota State University, 2012
Research Interests: Pulse Crop and Dry Bean disease management, fungicide efficacy and resistance management, pathogen detection and diversity

Shaobin Zhong, Ph.D.
North Dakota State University, 2000
Research Interests: Fusarium Head Blight of Wheat, Fungal Biology and Genetics, Genomics and Functional Genomics of Host-Pathogen Interaction in Cereal Crops

Adjunct

Timothy L. Friesen, Ph.D.
USDA/ARS
North Dakota State University, 2001
Research Interests: Host Parasite Interactions of Foliar Diseases of Cereals

Michael C. Edwards, Ph.D.
USDA/ARS
Cornell University, 1983
Research Interests: Virology, Cereal Virus Diseases

Rubella Goswami, Ph.D.
University of Minnesota, 2005
Research Interests: Pathogen Interactions, Fungal Biology, Molecular Biology and Genomics

Thomas J. Gulya, Ph.D.
USDA/ARS
Iowa State University, 1978
Research Interests: Downy Mildew, Rust, Phomopsis Stem Canker, Sclerotinia Wilt of Sunflower

Michael Wunsch, Ph.D.
Cornell University, 2010
Research Interests: Varietal Disease Resistance, Fungicide Efficacy and Timing, and Use of Cropping Systems to Manage Disease

Plant Sciences/Horticulture

Faculty

See page 144

Program and Application Information

Department Head:	Dr. Richard Horsley
Program Location:	166 Loftsgard Hall
Telephone Number:	(701) 231-7971
Degrees Offered:	Ph.D., M.S.
Application Deadline:	International applications are due May 1st for Fall and August 1 for Spring. Domestic applicants should apply at least one month prior to the start of classes.
Test Requirements:	GRE
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

The Department of Plant Sciences offers graduate studies leading to the M.S. degrees in Plant Sciences and Horticulture, and to a Ph.D. degree in Plant Sciences. Specialized academic and research training in Plant Sciences is available in plant breeding and genetics, weed science, biotechnology, field and forage crop production and management, and sports and urban turfgrass management. Areas of specialization in Horticulture and Forestry include breeding and genetics, biotechnology, physiology, propagation, and production and management of horticultural crops such as woody plants, potatoes, vegetables, and herbaceous ornamentals. Areas of specialization in cereal science may involve research in the areas of carbohydrates, enzymes, legumes, and other northern-grown crops; barley malting and brewing; wheat milling, baking, and pasta processing. Each study area is designed to provide students with a comprehension of the discipline and of relevant regional and global-community social issues.

The Department of Plant Sciences is located in Loftsgard Hall, completed in 1991, with modern and well-equipped research laboratories, offices for faculty and graduate students, and classrooms. Loftsgard Hall, which is part of the Plant Science Complex, provides a state-of-the-art facility for interdisciplinary research in plant sciences, ranging from basic studies and biotechnology to the more traditional applied areas. Facilities for cereal science research are located in Harris Hall. These facilities include analytical laboratories for grain quality research, baking, milling, malting and brewing, and pasta and noodle processing. State-of-the-art greenhouses and extensive growth chamber facilities are also available, as are 100 acres of field research land adjacent to the Plant Science Complex. An additional 500 acres of research land are located near the North Dakota State University campus. A horticultural farm only 25 miles west of campus has an extensive arboretum. Excellent supporting disciplines located nearby, or in the Plant Science Complex, include Soil Science, Botany, Cereal and Food Sciences, Biochemistry and Molecular Biology, Entomology, and Plant Pathology. The Department of Plant Sciences encourages interdisciplinary research, and students frequently tailor their research program to meet their interests by working with faculty in one or more of the supporting disciplines.

Graduate student numbers per faculty member are limited, so the student gets adequate personal attention and works closely with their adviser in research. Final selection of the adviser will be made on the basis of the student's interest, availability of space in the researcher's laboratory, and a common desire of the student and professor to work together. Not quite half of the graduate students are Ph.D. candidates.

Admissions Requirements

The Department of Plant Sciences graduate programs are open to all qualified graduates of universities and colleges of recognized standing. To be admitted with full status to the program, the applicant must meet the Graduate School admission requirements found on page 5.
Students who do not meet all requirements for admission, but show potential for successful graduate study, may be admitted under a conditional status. Evidence must be provided, showing that the applicant's potential is not adequately reflected by his/her record.

Financial Assistance

Research assistantships (half-time) are provided on a competitive basis, usually based on scholarship and potential to undertake advanced study and research. As of the 2011-12 academic year, the annual stipend generally is $17,000 for an M.S. candidate and $18,200 for a Ph.D. candidate, but this may vary based on the research project. Graduate tuition is waived for all students with research assistantships. A limited number of graduate fellowships are available. The information provided for the application to the Graduate School is also used to assign available assistantships to applicants. The Department of Plant Sciences also has numerous annual scholarships of $500 to $1000 each for outstanding Plant Sciences graduate students.

Degree Requirements

The M.S. program (Thesis Option) requires completion of at least 30 credits; this includes 10 credits of thesis research. The Ph.D. program requires completion of at least 90 credits; this includes 30 credits for an earned M.S. degree (Thesis Option) and 20 additional research credits. For each M.S. or Ph.D. candidate, a plan of study will be developed in the first year that meets the disciplinary requirements as well as the individual needs of the student. The faculty adviser and other members of the student's supervisory/advisory and examining committee assist in developing of the plan of study as well as the student's research plan. An M.S. Program (Comprehensive Study Option) is also offered in Plant Sciences. This option requires completion of at least 30 credits, including 3 credits of a Master's Paper. Candidates for the M.S. degree normally satisfy all requirements within a two-year period, and Ph.D. candidates normally require three additional years. For M.S. candidates, an oral examination of academics related to the discipline and the research-based thesis is required. The Ph.D. candidates are required to pass a preliminary written and oral examination of academics related to the discipline and a final oral defense of a research-based dissertation. A B.S. to Ph.D. program is permitted for students who meet higher admission requirements.

Faculty

Marisol Berti, Ph.D.
North Dakota State University, 2007
Research Interests: Forage and Biomass Crop Production

Xiwen Cai, Ph.D.
Washington State University, 1998
Research Interests: Wheat Genetics

Marcelo J. Carena, Ph.D.
Iowa State University, 1999
Research Interests: Corn Breeding

Michael J. Christoffers, Ph.D.
University of Missouri-Columbia, 1998
Research Interests:
Weed Science/Genetics

David Wenhao Dai, Ph.D.
North Dakota State University, 2001
Research Interests: Woody Plant Physiology, Biotechnology

Edward L. Deckard, Ph.D.
University of Illinois, 1970
Research Interests: Crop Physiology

Elias M. Elias, Ph.D.
North Dakota State University, 1987
Research Interests: Durum Wheat Breeding, Genetics

Farhad Ghavami, Ph.D.
Tehran University, 2004
Research Interest: Wheat Genetics

Kenneth F. Grafton, Ph.D.
University of Missouri, 1980
Research Interests: Dry Bean Breeding, Genetics

Greta Gramig, Ph.D.
University of Wisconsin-Madison
Research Interests: Weed Biology and Ecology

James J. Hammond, Ph.D.
University of Nebraska, 1969
Research Interests: Flax Breeding, Biometrics, Computer Programming

Harlene Hatterman-Valenti, Ph.D.
Iowa State University, 1993
Research Interests: High-Value Crop Production

Theodore C. Helms, Ph.D.
Iowa State University, 1986
Research Interests: Soybean Breeding, Genetics

Richard D. Horsley, Ph.D.
North Dakota State University, 1988
Research Interests: Barley Breeding, Genetics

Kirk A. Howatt, Ph.D.
Colorado State University, 1999
Research Interests: Weed Science-Annual Weeds

M. Javed Iqbal, Ph.D.
University of Illinois, 1995
Research Interests: Wheat Genetics

Brian Jenks, Ph.D.
University of Nebraska, Lincoln, 1996
Research Interests: Integrated Weed Management

Burton L. Johnson, Ph.D.
North Dakota State University, 1993
Research Interests: Crop Production

Thomas J. Kalb, Ph.D.
Virginia Polytechnic Institute & State University, 1988
Research Interests: Extension Horticulture

Herman J. Kandel, Ph.D.
North Dakota State University, 1995
Research Interests: Crop Production

Shahryar F. Kianian, Ph.D.
University of California-Davis, 1990
Research Interests: Wheat Germplasm Enhancement

Chiwon W. Lee, Ph.D.
Purdue University, 1977
Research Interests: Vegetables, Floriculture, Biotechnology

Deying M. Li, Ph.D.
Iowa State University, 2001
Research Interests: Sports Turf Management

Rodney G. Lym, Ph.D.
University of Wyoming, 1979
Research Interests: Weed Science-Perennial Weeds

Frank A. Manthey, Ph.D.
North Dakota State University, 1985
Research Interests: Durum and Pasta Quality

G. Francois Marais, Ph.D.
North Dakota State University, 1979
University of Stellenbosch, 1992
Research Interests: Hard Red Winter Wheat Breeding, Genetics

Phillip E. McClean, Ph.D.
Colorado State University, 1982
Research Interests: Dry Bean Genetics, Biotechnology

Michael S. McMullen, Ph.D.
University of Minnesota, 1976
Research Interests: Oat Breeding, Genetics

Kevin McPhee, Ph.D.
University of Idaho, 1995
Research Interests: Pulse Crop Breeding

Mohamed Mergoum, Ph.D.
Colorado State University, 1991
Research Interests: Hard Red Spring Wheat Breeding

Rebekah Oliver, Ph.D.
North Dakota State University, 2006
Research Interests: Genetics

Juan Osorno, Ph.D.
North Dakota State University, 2006
Research Interests: Dry Edible Bean Breeding

Mukhlesur Rahman, Ph.D.
University of Manitoba, 2007
Research Interests: Canola Breeding

Joel K. Ransom, Ph.D.
University of Minnesota, 1982
Research Interests: Small Grains

Andy Robinson, Ph.D.
Purdue University, 2012
Research Interests: Potato Production

Paul B. Schwarz, Ph.D.
North Dakota State University, 1987
Research Interests: Malting Barley Quality

Kalidas Shetty, Ph.D.
University of Idaho, 1989
Research Interests: Food Safety

Senay Simsek, Ph.D.
Purdue University, 2006
Research Interests: Hard Spring Wheat Quality

Jeff M. Stachler, Ph.D.
The Ohio State University, 2008
Research Interests: Weed Science and Weed Control in Sugarbeet

Asunta L. Thompson, Ph.D.
University of Idaho, 1998
Research Interests: Potato Breeding

Todd West, Ph.D.
Southern Illinois University, 2004
Research Interests: Woody Plant Improvement

M. Dale Williams, Ph.D.
The University of Arizona, 1978
Research Interests: Seedstocks, Crop Production

Qi Zhang, Ph.D.
Kansas State University, 2007
Research Interests: Turfgrass Stress Physiology

Richard K. Zollinger, Ph.D.
Michigan State University, 1989
Research Interests: Weed Science-Applied Weed Control

Alan J. Zuk, Ph.D.
Kansas State University, 2005
Research Interests: Sports and Urban Turfgrass Management

Adjunct

James V. Anderson, Ph.D.
Virginia Polytech Institute, 1990
Research Interests: Plant Biochemistry

James Beaver, Ph.D.
University of Illinois, 1980
Research Interests: Dry Bean Genetics

Bryan Brunner, Ph.D.
Michigan State University, 1992
Research Interests: Breeding Tropical/subtropical Crops

Larry G. Campbell, Ph.D.
Kansas State University, 1974
Research Interests: Sugarbeet Genetics

Flavio Capettini, Ph.D.
University of Minnesota, 1999
Research Interests: Barley Breeding

Patrick M. Carr, Ph.D.
Montana State University, 1989
Research Interests: Sustainable Agriculture

Shiaoman Shaw Chao, Ph.D.
North Carolina State University, 1984
Research Interests: Small Grains Genomics

Wun Shaw Chao, Ph.D.
University of California-Davis, 1996
Research Interests: Perennial Weeds

Lynn S. Dahleen, Ph.D.
University of Minnesota, 1989
Research Interests: Barley Genetics, Biotechnology

Justin D. Faris, Ph.D.
Kansas State University, 1999
Research Interests: Wheat Molecular Genetics

Michael E. Foley, Ph.D.
University of Illinois, 1982
Research Interests: Weed Biology

Karen L. Fugate, Ph.D.
Ohio State University, 1995
Research Interests: Sugarbeet Physiology

Russell Gesch, Ph.D.
Texas A&M University, 1995
Research Interests: Physiology of Oilseed Crops

Yong Qiang Gu, Ph.D.
University of California, 1994
Research Interests: Genetics

Elcio P. Guimaraes, Ph.D.
Iowa State University, 1985
Research Interests: Cereal Plant Breeding

Liebao Han, Ph.D.
China Agricultural University, 1996
Research Interests: Turfgrass Science

David P. Horvath, Ph.D.
Michigan State University, 1993
Research Interests: Perennial Weed Physiology

Khwaja Hossain, Ph.D.
University of Wales, 1995
Research Interests: Molecular Genetics and Genomics

Brent S. Hulke, Ph.D.
University of Minnesota, 2007
Research Interests: Flax and Sunflower Genetics

Chao C. Jan, Ph.D.
University of California, Davis, 1974
Research Interests: Sunflower Cytogenetics

Prem P. Jauhar, Ph.D.
Indian Agricultural Research Institute, 1963
Research Interests: Wheat Cytogenetics

Edward C. Lulai, Ph.D.
North Dakota State University, 1978
Research Interests: Potato Physiology

R. Macchiavelli, Ph.D.
Pennsylvania State University, 2006
Research Interests: Statistics/Biometry

Carlos Ortiz, Ph.D.
University of Arkansas, 1993
Research Interests: Genetics-Starchy Crops and Turf

Timothy Porch, Ph.D.
Cornell University, 2001
Research Interests: Dry Bean Breeding and Genetics

Lili Qi, Ph.D.
Nanjing Agricultural University, 1997
Research Interests: Wheat Genetics

Gerald J. Seiler, Ph.D.
North Dakota State University, 1980
Research Interests: Sunflower and Sugarbeet Germplasm

Joseph R. Sowokinos, Ph.D.
University of North Dakota, 1969
Research Interests: Potato Physiology

Jeffrey C. Suttle, Ph.D.
Michigan State University, 1979
Research Interests: Potato Physiology

Linda Wessel-Beaver, Ph.D.
University of Illinois, 1981
Research Interests: Tropical Pumpkin and Squash Breeding

Jochum Wiersma, Ph.D.
University of Minnesota, 1995
Research Interests: Small Grains

Steven S. Xu, Ph.D.
North Dakota State University, 1994
Research Interests: HRSW Development

Psychological Clinical Science

Program and Application Information

Department Chair:	Dr. James Council
Department Location:	232 B2 Minard Hall
Telephone Number:	(701) 231-7065
Degree Offered:	Ph.D.
Application Deadline:	February 1
Test Requirements:	GRE
English Proficiency Requirements:	TOEFL ibT 100 IELTS 7

Program Description

The primary purpose of this program is to prepare students for careers in academic or research settings. Thus, a major emphasis is on research training. We hope to train researchers who will contribute to psychological knowledge through the investigation of clinically relevant issues, including basic research on the nature, etiology, and course of health related problems or psychological disorders, as well as applied research which investigates the prevention and treatment of health and mental health problems.

Admissions Criteria

When making admissions decisions grades, GRE scores, research experience, letters of recommendation (preferably from faculty who can comment on your research skills and academic potential), and the personal statement are considered. To the extent that an applicant has a strong background in psychology, including coursework in statistics, research methods, abnormal psychology, and personality and good research experience, this will be an advantage.

Applicants who already have a master's degree will be judged by the same criteria. For applicants with a master's degree, credit towards the doctorate will depend on how well previous course work matches with our own requirements.

Campus visits or interviews are not required, however, the department may arrange for a visit via phone or internet video with top candidates.

Applications are due by February 1 in order to receive full consideration for admission in the upcoming academic year. Admission decisions will be made by mid-March. Applications are reviewed once a year and students are admitted for fall semester only.

Program Requirements

Students are required to gain a breadth of knowledge in the foundations of psychology through courses in bio-logical, cognitive, and social bases of behavior. Coursework in research methods and statistics, assessment, psychopathology, health, and interventions comprise the clinical portion of the curriculum.

Faculty

James R. Council, Ph.D.
University of Connecticut, 1984
Field: Clinical; Personality, Assessment, Clinical and Experimental Hypnosis

Keith Donohue, Ph.D.
Florida State University, 2011
Field: Clinical; Substance Abuse, Research Methods, and Teaching

Robert Dvorak, Ph.D.
University of South Dakota, 2012
Field: Clinical; Self-Regulation, Health, and Addiction

Kathryn Gordon, Ph.D.
Florida State University, 2008
Field: Clinical; Disordered Eating, Suicidal Behavior

Wendy P. Gordon, Ph.D.
University of Illinois at Urbana-Champaign, 2002
Field: Child Development, Social Development and Peer Relations

Clayton Hilmert, Ph.D.
University of California at San Diego, 2003
Field: Health/Social; Stress, Psychophysiology, and Health

Paul D. Rokke, Ph.D.
University of Houston, 1985
Field: Clinical; Psychopathology

Practica at local hospitals, clinics, and mental health agencies provide supervised experience in service delivery and applied research. This is a full-time program and will take 5 years, including internship, to complete.

Evaluation and Intervention

- Four courses cover content related to the history of clinical psychology, ethics, psychopathology, and current empirically supported approaches to assessment and treatment. Total of 13 credits. 755 Behavior Therapy and Assessment I (3) 756 Behavior Therapy and Assessment II (4) 770 Advanced Psychological Assessment (3)Choose one course on current theories and research on psychopathology with a focus either on adulthood or childhood. 672 Advanced Psychopathology (3) or 673 Child Psychopathology and Therapy (3)
- 758 New Course, Diversity in Clinical Practice and Cultural Psychology (3)
- Clinical training. 795 Practicum (16 credits)
- 794 Internship (2 credits)

Fundamentals of Psychology and Breadth

One course from each of three core categories to include an option for the biological basis of behavior, the cognitive basis of behavior, and the social basis of behavior. These courses are for breadth. Students may choose the particular courses and may take additional elective courses to supplement their knowledge and research skills in Health, Social, Cognition, or Vision. Total of 9 credits.

- Biological Basis of Behavior 660 Sensation and Perception or 665 Psychobiology or 686 Neuropsychology or 718 Visual Neuroscience
- Cognitive Basis of Behavior661 Memory and Knowledge or 664 Attention and Thinking or 720 Cognitive Neuroscience
- Social Basis of Behavior653 Organizational Psychology or 670 Experimental Social Psychology or 771 Social/Health Psychology or 787 Advanced Social Psychology and Health

Research Training

- 793 Individual Study (6)
- 798 Thesis (variable credits)
- 799 Dissertation (variable)
- Three courses on research methods. Total of 9 credits.
  640 Experimental Methods (3)
  761 Applied Research Methods (3)
  762 Advanced Research Methods/Analysis (3)
- Psyc 790 Graduate Seminar (8)

Teaching Requirement

- One course and seminar in college teaching. Total of 4 didactic credits.
  Hum 702 College Teaching (3)
  Psyc 791 Teaching Psychology (1)
  Psyc 794 Teaching Practicum (4)

Psychology

Program and Application Information

Department Chair:	Dr. James Council
Department Location:	232 B2 Minard Hall
Telephone Number:	(701) 231-7065
Degree Offered:	Ph.D.
Application Deadline:	February 15
Test Requirements	GRE
English Proficiency	TOEFL ibT 79
Requirements:	IELTS 6

Program Description

The Department of Psychology at North Dakota State University grants both M.S. and Ph.D. degrees. We have three doctoral programs that prepare students for research and academic careers: Psychological Clinical Science, Visual and Cognitive Neuroscience, and Health/Social Psychology.

Doctoral Programs
Students enter one of three Ph.D. programs: Psychological Clinical Science, Visual and Cognitive Neuroscience, or Health/Social Psychology. These areas represent the strengths of the department's faculty in experimental research, as well as three of the most active and cutting-edge areas in the field of psychology. The program accommodates approximately 20 students, with approximately 4 new Ph.D. degrees awarded each year. Training in the program includes course work in the student's area of emphasis, as well as methods courses, breadth requirements, and research experience under the supervision of a faculty mentor. Training and experience in college-level teaching is an important part of all three programs. Student support is available through teaching assistantships, research assistantships, and teaching stipends.

Admissions Requirements

The Department of Psychology graduate programs are open to qualified graduates of universities and colleges of recognized standing. Applications are due by February 15 in order to receive full consideration for admission in the upcoming academic year. However, applications will be considered after this date to the extent that space in the program is still available.

Financial Assistance

Students are routinely supported through research and teaching assistantships. Applicants are considered on the basis of scholarship,

Faculty

Benjamin J. Balas, Ph.D.
Massachusetts Institute of Technology, 2007
Field: Brain and Cognitive Sciences

Barbara Blakeslee, Ph.D.
University of California, Santa Barbara, 1983
Field: Biopsychology, Vision Science

Martin D. Coleman, Ph.D.
University of Sussex, 2005
Field: Emotion and Decision Making

Erin Conwell, Ph.D.
Brown University, 2009
Field: Cognitive and Linguistic Sciences

James R. Council, Ph.D.
University of Connecticut, 1984
Field: Clinical Psychology; Personality, Assessment, Clinical and Experimental Hypnosis

Keith F. Donohue, Ph.D.
Florida State University, 2011
Field: Clinical Psychology; Alcohol, Research Methods, Teaching

Robert D. Dvorak, Ph.D.
The University of South Dakota, 2012
Field: Clinical Psychology; Self-regulation, Health-Risk Behaviors, & Ecological Momentary Assessment

Kathryn H. Gordon, Ph.D.
Florida State University, 2008
Field: Clinical Psychology, Eating Disorders, Suicidal Behavior

Robert D. Gordon, Ph.D.
University of Illinois at Urbana-Champaign, 1999
Field: Cognitive Neuroscience, Attention, Representation, Visual Information Processing

Wendy Troop-Gordon, Ph.D.
University of Illinois at Urbana-Champaign, 2002
Field: Child Development, Social Development and Peer Relations

Clayton J. Hilmert, Ph.D.
University of California, San Diego, 2003
Field: Health and Social Psychology; Stress Psychophysiology, Cardiovascular Health, and Pregnancy

Verlin B. Hinsz, Ph.D.
University of Illinois, 1983
Field: Social and Industrial/ Organizational; Small Group Performance, Group Decision Making

Jeffrey S. Johnson, Ph.D.
University of Iowa, 2008
Field: Visual Cognitive Neuroscience

Linda Langley, Ph.D.
University of Minnesota, 1998
Field: Cognitive Neuroscience, Cogni-

potential to undertake advanced study and research, and financial need. All students who submit complete applications to the program by the appropriate deadlines are considered for assistantships. There is not a separate application for financial aid. Doctoral students are eligible for university fellowships that are awarded on a competitive basis.

Requirements for Doctor of Philosophy in Psychology:

1. Complete a master's degree in Psychology. This may be done at NDSU or elsewhere.
2. Complete at least 90 hours of graduate credit, including those completed for the master's degree;
3. 60 or more of these credits must be earned at NDSU. At least 30 credit hours must be in approved didactic courses, and at least 18 of these must be at the 700 level.
4. Complete quantitative and research methods courses (Psyc 640 and 762, plus Psyc 761 for Health/Social).
5. Complete core courses in the specific program area: Health & Social Psychology - four courses: Psyc 733, 771, 782, 787 Visual & Cognitive Neuroscience - three courses from Psyc 718, 720, 727, 731,760, 764 Psychological Clinical Science – Psyc 755, 756, 770, 672 or 673, 758, 794, 795.
6. Complete three (for Psychological Clinical Science), two (for Health/Social students), or one (for Visual & Cognitive Neuroscience students) breadth courses at the graduate level from area outside specialty track (which can include approved courses from other departments).
7. Complete Psyc 790 (graduate seminar and colloquium series) each semester.
8. Participate in a continued program of research apprenticeship with at least one faculty member and, accordingly, enroll in Psyc 793 each semester for 1-5 credits.
9. Teach one undergraduate course under the supervision of a faculty member, after completion of Hum 702, Introduction to College Teaching in the Humanities and Social Sciences, or BIOL 705/Educ705, Teaching College Science.
10. Complete a major area paper to serve as the comprehensive exam for Ph.D. candidacy. The area paper will be a comprehensive literature review of the student's area of research and will include an oral defense.
11. Complete the dissertation. The student will defend a written proposal before a faculty committee, conduct an original research project, and complete a comprehensive written report on the project. The student will complete a final oral defense before the same committee.

tive Aging, Attention

Kevin D. McCaul, Ph.D.
University of Kansas, 1978
Field: Social Psychology; Health Behavior, Applied Social Psychology

Mark E. McCourt, Ph.D.
University of California, Santa Barbara, 1982
Field: Biopsychology, Vision Science; Visual Psychophysics, Neuropsychology

Mark Nawrot, Ph.D.
Vanderbilt University, 1991
Field: Visual Neuroscience; Neural Mechanisms for Perception of Depth and Motion, Eye Movements, Alcohol

Michael D. Robinson, Ph.D.
University of California, Davis, 1996
Field: Social/Personality Affective Processes

Paul D. Rokke, Ph.D.
University of Houston, 1985
Field: Clinical Psychology; Psychopathology

Clay Routledge, Ph.D.
University of Missouri-Columbia, 2005
Field: Health and Social Psychology

Laura E. Thomas, Ph. D.
University of Illinois, 2008
Field: Embodied cognition, Links between action, perception, and cognition

David A. Wittrock, Ph.D.
State University of New York at Albany, 1990
Field: Clinical Psychology; Behavioral Medicine, Headache, Stress, Appraisal and Coping

Adjunct

Terence W. Barrett, Ph.D.
University of North Dakota, 1989
Field: Counseling; Issues in Therapy, Forensic Psychology

Scott G. Engel, Ph.D.
North Dakota State University, 2003
Field: Health and Social Psychology; Obesity and Eating Disorders

Holly Hegstad, Ph.D.
University of North Dakota, 1999
Field: Clinical Psychology; Anxiety and Mood Disorders

Jessica T. Kaster, Ph.D.
University of South Dakota, 2004
Field: Clinical Psychology; Child Psychopathology, Assessment

H. Katherine O'Neill, Ph.D.
University of North Dakota, 1991
Field: Clinical Psychology; Psychopathology, Addiction, Anxiety

Public Health

Program and Application Information

Program Director:	Dr. Donald Warne
Program Coordinator:	Stefanie Meyer
Location:	118H Sudro Hall
Telephone Number:	(701) 231-6549
Degree Offered:	MPH
Application Deadline:	The first review of applications will be on January 18th, 2013 and will be rolling until filled. The program has 25 spots available.
Test Requirements:	GRE
English Proficiency Requirements:	TOEFL ibT 90 IELTS 6.5

Faculty

Pharmacy
Donald Warne, MD, MPH
David Scott, Ph.D., MPH

Health Promotion
Ardith Brunt, Ph.D., RD

Emergency Management
Daniel J. Klenow, Ph.D.
Carol Cwiak, J.D., Ph.D.
Jessica Jensen, Ph.D.
George Youngs, Ph.D.

Infectious Disease
Eugene Berry, Ph.D.
Nathan Fisher, Ph.D.
Margaret Khaitsa, Ph.D.
John McEvoy, Ph.D.
Birgit Pruess, Ph.D.
Jane Schuh, Ph.D.

Program Description

Public health is defined as the practice of helping members of society live healthier, longer lives. Public health is both an art and a science, and is practiced by multidisciplinary teams of professionals whose training spans a wide array of medical, social, and physical sciences. Public health focuses on the general health of communities through efforts to monitor the spread of diseases, initiatives, (both clinical and policy-oriented) to prevent disease and disability, and by promoting healthy lifestyles through education and community engagement.

The MPH program is a 42 credit cooperative program between UND and NDSU that offers diverse tracks in public health that build upon the strengths of both campuses to meet the practical needs of the public and health care practitioners who serve it. The program focuses on rural health, health promotion and prevention, disease state management, and related activities of interest to North Dakota public health care practitioners and policy makers. Specific tracks of concentration at NDSU include pharmacy, emergency management and preparedness, health promotion, and infectious disease.

Admission Requirements

All admission decisions are based upon full review of *all* information in the application in order to ensure fairness and to balance the limitations of any single element of the application. Strong preference for admission will be given to applicants with at least one year of practical experience in their field, including practical field experience gained within an academic program.

Minimum Program Admission Requirements
In addition to the Graduate School requirements found on page 5, applicants must have adequate preparation in a field related to public health and show potential to undertake advanced study, research and practical training as evidenced by previous academic accomplishment and experience.

The Admissions Committee will invite selected applicants for an interview on the basis of the Committee's review of all submitted application materials.

Final decisions will be made after all interviews are completed. Satisfactory completion of a background check is required prior to admission.

Policy on Transfer of Credit

A limited amount of graduate work completed at a regionally accredited North American institution prior to, or after matriculation in the program, may be applied toward the MPH. Graduate work is considered for transfer only on an individual basis and only after the student has completed satisfactory work in the program. Those transfer credits approved by the student's advisor, course instructor, Program Director, and the Dean of the Graduate School will be included in the Program of Study for the MPH degree and only those transfer credits will be recorded on the transcript.

The basic purpose of the transfer policy is to ensure that transferred work is of comparable content, level, timeliness, and quality to that which would be taken at either UND or NDSU and included on a Program of Study for a masters degree. The following policies are generally applicable to the acceptance of the graduate work for transfer:

- The work must have been undertaken at an accredited North American institution.
- The student must have been enrolled at that institution as a graduate student.
- The work must have received graduate credit at the institution where it was earned.
- The student must have earned a grade of B or better.
- The work must be less than seven years old at the time the MPH degree is awarded.

The maximum amount of transfer credit that will be accepted toward the MPH degree is nine (9) semester credit hours.

The core area coursework will be evenly split between the two institutions; all students will take 10 credits from NDSU and 10 credits from UND (regardless of whether the student is registered as a "NDSU" or "UND" student).

Required Coursework-20 credits

Council on Education for Public Health Core Area/Courses		Credit Hours
Fall:		
Epidemiology	MPH 5/751: Epidemiology (UND)	
Social & Behavioral Sciences	MPH 5/741: Social and Behavioral Sciences in Public Health (UND)	
Health Services Administration	MPH 5/704: Leading and Managing Public Health Systems (NDSU)	
	MPH 5/700: Public Health as a Team Endeavor (NDSU)	
Spring:		
Biostatistics	MPH 5/731: Biostatistics (UND)	
Social & Behavioral Sciences	MPH 5/743: Ethics in Public Health (UND)	
Health Services Administration	MPH 5/710: Health Care Delivery in the U.S. (NDSU)	
Environmental Health	MPH 5/720: Environmental Health (NDSU)	

Master's Paper (MPH 793, 3 credits)

The MPH master's paper is a requirement for graduation for students in the Master of Public Health (MPH) Program. This is an opportunity to work on public health projects under the direction of faculty and community public health practitioners or researchers. The goal is to synthesize, integrate and apply the skills and competencies acquired in the MPH Program to a public health problem. Completion of the MPH master's paper requires both written and oral components.

Practicum/Internship (MPH 794, 3 credits total)

Concepts and competencies learned from MPH coursework are integrated through a minimum of 240 hours practicum that provides an opportunity to apply knowledge in a practice setting. A wide range of settings and opportunities are available and are individually tailored to assure competence in general MPH and specialization-specific skills. The practicum is designed to meet student goals, specialization criteria, and the needs of the agencies or institutions involved. The practicum is selected by the student

in consultation with faculty and approved by the advisor. This experience is usually completed in the student's final term in the program and often results in the capstone project written report and presentation. However, students may register for 1 to 3 credits, repeated up to 3 times if appropriate.

All work must be approved in advance by the Director of the MPH program. Students cannot receive credit for past work experience.

MPH Seminar (MPH 790, 1 credit)
A series of seminars will be offered for students who have completed the core courses that cover current issues in public health and integrate the cross-cutting competencies of program-planning, professionalism, public health biology, leadership, diversity and culture, communication and informatics and systems thinking.

Specialization (minimum 15 credits) NOTE: Not all specialization courses may be offered online.

Total = 42 credits

NDSU Specializations

American Indian Public Health

The American Indian (AI) population suffers from among the worst public health disparities in the nation. In the northern plains, including North Dakota, the AI population has the highest rates of death due to diabetes, cancer, infant mortality, unintentional injuries, suicide, and other diseases. Risk factors and social determinants of these disparities include high rates of smoking, substance abuse, poverty, poor nutrition, historical trauma, and other unique circumstances that need to be addressed in the public health arena. In addition, the unique AI health policy considerations and the federal trust responsibility to provide health services to the AI population are poorly understood among most public health leaders.

NDSU is the only MPH Program in the nation offers a curriculum that is specifically designed to prepare graduates to work in AI populations and to improve AI population health. Students will take the required Core MPH coursework (Biostatistics, Epidemiology, Leading and Managing Public Health Systems, Environmental Health, Social and Behavioral Sciences in Public Health, and Healthcare Delivery in the U.S.). In addition, students will be required to complete the MPH Practicum and the Master's paper—each will be focused on American Indian Public Health. The 18-credit Specialization Curriculum is described below.

Course		**Credit Hours**
Required:		
Fall 2013:		
MPH 771	American Indian Health Policy	3
Spring 2014:		
MPH 773	Cultural Competence in Indian Health	3
MPH 774	Research Issues in Tribal Communities	3
MPH 775	Case Studies in Indian Health	3
*And choose 6 credits from the following **elective** courses:*		
Indigenous Food Systems and Nutrition		3
American Indian Elder Care		3
Other MPH Specialization course		3

Disaster and Emergency Preparedness

As the domestic and global hazard landscape evolves and shifts around natural, technological, and biological hazard events including pandemics, flooding, tornadoes, hazmat incidents, hurricanes, bioterrorism and other health impacting mass causality/fatality events, the interaction of public health profession-

als with a range of organizational partners in emergency management has increased. This specialization is designed to provide grounding in the organizational processes of preparedness and response that characterize these critical relationships as well as the policy frameworks that structure these collaborative engagements.

Course	Credit Hours
Required:	
Fall 2013-2014: EMGT 761 Preparedness Theory and Practice	3
Spring 2013-2014: EMGT 763 Response Theory and Practice	3
Fall 2014-2015: EMGT 762 Mitigation Theory and Practice	3
*And choose 6 credits from the following **elective** courses:*	
Fall 2013-2014:	
EMGT 610 Comprehensive Emergency Management Planning	3
SOC 643 International Disasters	3
EMGT 625 International Emergency Management	3
Spring 2013-2014: EMGT 661 Business Continuity and Crisis Management	3
Fall 2014-2015: EMGT 764 Recovery Theory and Practice	3
Spring 2014-2015:	
EMGT 663 Voluntary Agency Disaster Services	3
EMGT 661 Business Continuity and Crisis Management	3
EMGT 645 Vulnerability and Functional Needs in Emergency Management	3

Health Promotion

The Health Promotions specialization is designed to prepare health professionals who have a career interest in physical activity and/or nutrition. The program provides students with unique opportunities to study issues and concepts germane to lifestyle behavior modification in the context of promoting health and preventing chronic disease. Students will acquire appropriate background knowledge and experience in an epidemiological approach to public health problems that relate to physical activity and nutrition; and develop skills integral to the design, implementation, and evaluation of programs intended to promote population-based increases in physical activity and healthy nutrition.

Course	Credit Hours
Required:	
Fall (odd years starting 2013): HNES 721 Health Promotion Programming	3
Spring (even years starting 2014):	
HNES 724 Nutrition Education	3
HNES 727 Physical Activity and Wellness	3
And choose 6 credits from the following courses:	
Fall:	
HNES 652 Nutrition, Health and Aging	3
HNES 710 Recent Literature and Research in HNES	3
Spring (odd years starting 2013)	
HNES 726 Nutrition in Wellness	3
HNES 754 Assessment in Nutrition/Exercise Science	3

Infectious Disease Management

This specialization is designed to develop knowledge and expertise in the areas of infectious disease pathogenesis with an emphasis on microbial pathogens, and the application of modern technologies and epidemiologic skills to prevent and control problems arising from infectious diseases. An emphasis

will be placed on the understanding of zoonotic disease (diagnosis, prevention and management), the investigation of emerging infectious diseases, and enhancing the public response to a bioterrorism event or biosecurity emergencies. Pathogen recognition, pathogen management and methods of disease prevention and mitigation will be areas of focus.

Course	Credit Hours
Required	
Fall:	
MICR 670: Basic Immunology	3
Spring:	
MICR 650: Infectious Disease Pathogenesis	3
MICR 756: Zoonoses and Rural Public Health	3
*And choose 6 credits from **elective** courses*	
Fall:	
MICR 675 Animal Virology	3
MICR 665 Fundamentals of Animal Disease	3
MICR 750 Advanced Topics in Epidemiology	3
MICR 775 Molecular Virology	3
Spring:	
MICR 663 Clinical Parasitology	3
MICR 770 Immunology of Chronic Infections	3
MICR 781 Adv. Bacterial Physiology (even years)	3
MICR 722 International Health Systems, Policy and Biosecurity	2
MICR 724 Applied Epidemiology and Biostatistics	3
MICR 756 Zoonoses and Rural Public Health (starting 2014)	3

Pharmacy and Public Health

This specialization is for licensed pharmacists or students enrolled in a Doctor of Pharmacy program. It is designed to provide pharmacists with a better understanding of their diverse roles in public health in conjunction with other health professionals, and specifically to train pharmacists to plan, implement, and assess the outcomes of public health interventions in pharmacy practice settings. Other licensed health professionals who prescribe or dispense medications regularly are also eligible to apply for this track.

Course	Credit Hours
Required:	
Fall 2013, 2014	
PHRM 665: Health Disparities and Cultural Competence in Health Care	3
Spring 2013, 2014	
PHRM 700: Chronic Illness	3
Fall 2014	
PHRM 715: Quantitative Methods for Outcomes Research	3
And choose 6 credits from ***elective*** courses, including the following:	
Spring 2013, 2014, 2015	
PHRM 620: Special Populations	3
PHRM 685: Economic Outcomes Assessment	2
Spring 2013, 2014, 2015, Fall 2014	
PHRM 636: Neuropsychiatric Pharmacotherapy	3
Fall 2013, 2014	
PHRM 632: Infectious Disease Pharmacotherapy	3
Spring 2014, 2015	
PHRM 638: Cardiopulmonary Pharmacotherapy	4
Spring 2015	
PHRM 716: Pharmaceutical Health Outcomes Research	3

Range Sciences

Program and Application Information

Interim Director:	Dr. Frank Casey, School of Natural Resource Sciences
Program Leader:	Dr. Kevin Sedivec
Department Location:	106 Walster Hall
Email:	Kevin.Sedivec@ndsu.edu
Telephone Number:	(701) 231-8901
Degrees Offered:	Ph.D., M.S.
Application Deadline:	International applications are due May 1 for fall semester and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements	TOEFL ibT 71 IELTS 6

Program Description

The Range Science program in the School of Natural Resource Sciences offers graduate study leading to M.S. and Ph.D. degrees. Advanced work may involve specialized training in the following areas: rangeland ecology, ecosystem science, vascular plant systematics, and natural resources management.

Student research and academic programs are tailored to individual student needs and interests. Interdisciplinary approaches to range science programs are fostered.

Admissions Requirements

The Range Science graduate program is open to all qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements found on page 5, the applicant must have adequate preparation in range science or in a complementary area of natural sciences, have a background or interest in agriculture, and show potential to undertake advanced study and research as evidenced by academic performance and experience.

Financial Assistance

Research assistantships are available. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research. To be considered for an assistantship, a completed Graduate School application, official transcripts, three letters of reference, and a TOEFL score for international applicants must be submitted to the Graduate School no later than April 15.

Faculty

Edward S. DeKeyser, Ph.D.
North Dakota State University, 2000
Research Interests: Rangeland Ecology, Grazing Management, Wetland Ecology and Assessment

Kevin K. Sedivec, Ph.D.
North Dakota State University, 1994
Research Interests: Grazing Systems and Upland Nesting Birds, Leafy Spurge Control Using Grazing, Range Nutrition

Adjunct Faculty

Xuejun Dong, Ph.D.
Chinese Academy of Sciences, 1997
Central Grasslands Research Extension Center, Streeter, ND
Research Area/Activity: Plant Water Use in Rangelands

Benjamin Geaumont, Ph.D.
North Dakota State University, 2009
Hettinger Research and Extension Center
Research Area/Activity: Interactions Between Agriculture, Wildlife, and the Environment

Christina Hargiss, Ph.D.
North Dakota State University, 2009
School of Natural Resource Sciences
Research Area/Activity: Wetland Ecology, Assessment and Monitoring

John Hendrickson, Ph.D.
Texas A&M University, 1996
USDA, Mandan, ND
Research Area/Activity: Rangeland Ecology and Management

Paul Nyren, M.S.
Washington State University, 1975
Central Grasslands Research Extension Center; Streeter, ND
Research Area/Activity: Range Ecology, Fertilization and Management

Chris Schauer, Ph.D.
Oregon State University, 2003
Hettinger Research Extension Center
Research Area/Activity: Nutritional Management of Grazing Livestock

Lance Vermeire, Ph.D.
Texas Tech University, 2002
USDA-ARS Fort Keogh, Miles City, MT
Research Area/Activity: Grazing Ecology, Prescribed Fire, Drought Effects on Rangelands

Degree Requirements

The range science program has two options for the M.S. degree: the thesis option and the comprehensive study option. The M.S. program requires completion of 30 semester credits of approved graduate and letter-graded course work with an overall GPA of 3.0 or better. The Ph.D. program requires the completion of 90 semester credits (or the equivalent) of graduate approved and letter graded course work with an overall GPA of 3.0 or better.

Each student must choose an adviser, usually based upon area of academic and research interest, within the first program year. By the end of the first year of residence, the student must have selected an advisory/supervisory committee and have an approved graduate plan of study, including a research proposal. The advisory/supervisory committee advises the student and administers the graduate exams to the student. Students are referred to the Range Science Graduate Student Handbook for information regarding additional requirements.

Candidates for the M.S. normally complete their degree requirements in two years. Candidates for the Ph.D. generally complete their degree requirements in three to four years.

The M.S. candidates are required to take an oral examination which covers both the research and academic subject matter covered in their program. Candidates for the Ph.D. are required to take a preliminary written and oral examination directed toward the academic subject matter of their chosen discipline and a final defense of a research based thesis.

Rhetoric, Writing and Culture

Faculty
***see English on page 111**

Program and Application Information

Department Chair:	Dr. Kevin Brooks
Department Location:	219 Morrill Hall
Graduate Coordinator:	Dr. Bruce Maylath
Email:	Bruce.Maylath@ndsu.edu
Telephone Number:	(701) 231-7143
Degree Offered:	Ph.D.
Application Deadline:	February 1 for fall semester only
Test Requirements:	GRE General Test
English Proficiency :	TOEFL ibT 100
Requirements	IELTS 7

Doctor of Philosophy

The Rhetoric, Writing and Culture Ph.D. degree program is open to all qualified graduates of universities and colleges of recognized standing. The Ph.D. in Rhetoric, Writing and Culture provides students with employable skills in the area of professional and technical communication. This innovative and regionally unique program invites students to work at the intersection of rhetorical, textual, and cultural studies. The number of positions available in technical communication significantly surpasses the number of new Ph.D.s produced each year by a sizable margin. Graduates from NDSU's program may pursue careers as:

- professors in universities or colleges;
- training and development specialists, user-experience experts, and human-computer interaction specialists in industry;
- technical, scientific, or professional writers and editors in research and development organizations, high-tech companies, non-profit organizations, or government agencies.

Hands-on experience is essential to our program. The Rhetoric, Writing and Culture Ph.D. requires six credits of experiential learning. Students can work with professors or mentors in disciplinary writing. Others opt to intern for non-profits or local industries.

NDSU offers opportunities for students in the Ph.D. program to teach discipline-specific writing, such as writing in the sciences, writing for engineers and writing in business and finance. Ph.D. students are eligible for Presidential Doctoral Graduate Fellowships.

To be admitted with full status to the program, the applicant must fulfill all of the requirements set out below.

Admissions Requirements

- In most cases, applicants are expected to have completed a Master of Arts or Science, but exceptional candidates may be admitted directly out of the Bachelor's degree
- Have completed a BA, BS, MA, or MS from an accredited educational institution.
- Have a minimum cumulative grade point average (GPA) of 3.5.

Conditional admission may be granted to students who do not meet all requirements for admission or have deficiencies in prerequisite course work, but demonstrate potential for graduate study. Such students may be required to take additional courses to address deficiencies in prerequisite course work. In addition to the Graduate School required materials, applications must include:

- an academic **writing sample**, not to exceed 20 pages, that reflects the student's academic or professional interests and that demonstrates the student's critical and analytical abilities
- A **statement of purpose** that includes the following:
    - coursework you plan to complete in the program
    - faculty members with whom you wish to study
    - scholarship you plan to pursue
    - a sense of what you hope to do once you have completed a Ph.D. degree in English
    - how your education and/or life experience have prepared you for graduate work
- **official transcripts** from all previous undergraduate and graduate records
- when applicable, a **letter** stating your interest in and qualifications for a teaching assistantship.

Preferred additional materials:
- Practical and / or Professional writing sample not to exceed 10 pages

Financial Assistance

Teaching assistantships are available and are based on the applicant's scholastic record and letters of recommendation. However, the student must first make application to the Graduate School and be accepted for admission before she/he is eligible for an assistantship in the Department of English. Letters of application for teaching assistantships should be submitted at the same time as the application to the program is submitted to the graduate school and should specify experience and qualifications.

Graduate students are awarded teaching assistantships for the academic year only. As of the 2009-2010 academic year, the annual stipend is $14,000. University graduate tuition charges (not fees) are waived for all TAs. Teaching Fellowships are available to selected TAs after completing course work. Moreover, the Department of English annually awards the Rooney Scholarship (2010: $1,220) and the Madeline S. Gittings Scholarship (2010: $1,000) to deserving graduate students.

Degree Requirements

The Ph.D. program requires 90 credits beyond the baccalaureate degree and a minimum of 60 graduate credits at NDSU. Students must take a minimum of 30 credits at the 700 level.

Students admitted to the Ph.D. are required to demonstrate foreign language competency by the time they begin to write the dissertation. Students may meet this requirement in one of the following ways:

1. Demonstrate advanced reading competency in one foreign language equivalent to successful completion of a second-semester, third-year (300-level, 6th semester) college language course.
2. Demonstrate intermediate reading competency in two foreign languages equivalent to successful completion of two second-semester, second-year (200-level, 4th semester) college language courses.
3. Demonstrate intermediate reading competency in one foreign language equivalent to successful completion of a second-semester, second-year (200-level, 4th semester) college language course and, in consultation with the student's advisor and the graduate director, demonstrate competency in one special research skill (written rationale will be required at time of request). See Graduate Handbook for additional information.

Within the first semester of graduate work, each student is assigned an academic adviser who helps in overseeing the student's plan of study. A graduate student in English should enroll in no more than 3 credits of ENGL 793, Individual Study/Tutorial, during his/her graduate career. Exceptions are provided for through a graduate form signed by the chair of the department and the adviser.

Plan of Study

Students must

- Complete 6 credits of Core courses, consisting of ENGL 760 Graduate Scholarship, ENGL 755 Composition Theory, and ENGL 764 Classroom Strategies for TAs.*
- Complete 6 credits in Research Methods courses, selected from ENGL 762 Critical Theory, ENGL 756 Composition Research, Communication 708 Advanced Qualitative Methods in Communication, Communication 767 Rhetorical Criticism, History 701 Methods of Historical Research, or Sociology 700 Qualitative Methods.
- Complete 33 credits in Didactic Courses. 18 credits must be in Rhetoric and Writing courses (two courses must be from English and two from Communication) and 15 credits of Elective courses (any graduate-level class not listed elsewhere on the student's plan of study, approved by student's adviser).
- Complete 24 credits in English studies courses (literature and linguistics). Students may transfer in graduate credits in this area or take English 600 and 700 level literature and linguistics classes not listed as part of the English Ph.D.
- Complete 6 credits of Experiential Learning, including teaching mentorships, field experiences, and internships, inside or outside the academy in research, administrative, editing, consulting, or writing roles.
- Complete Doctoral Comprehensive Exams when 72 credits are complete. The dissertation proposal is submitted after the successful completion of the comprehensive exams.
- Complete ENGL 799 (Doctoral Dissertation).

*Graduate students are strongly advised to take Core courses in their first year in the program or as soon as these courses are offered.

STEM Education PhD (Interdisciplinary)

Program Director:	Dr. William Martin, Head of NDSU School of Education
Department Location:	School of Education, FLC 210
Telephone Number:	(701) 231-7921
Degrees Offered:	Ph.D. (Dual Major in STEM Education and STEM discipline is an option)
English Proficiency Requirements:	TOEFL ibT 88 IELTS 6.5

Program Faculty

William Martin,
Mathematics/STEM Education

Abraham Ayebo,
Mathematics Education

Warren Christensen,
Physics/STEM Education

Mila Kryjevskaia
Physics/STEM Education

Jennifer Momsen
Biology/STEM Education

Lisa Montplaisir
Biology/STEM Education

James Nyachwaya
Chemistry Education

Erika Offerdahl
Biochemistry/STEM Education

Program Description

Applicants are invited for NDSU's interdisciplinary PhD program in Science-Technology-Engineering-Mathematics (STEM) Education. The purpose of this interdisciplinary program is to prepare future college faculty whose research focus is on teaching and learning at the collegiate level *and* who can successfully teach at the undergraduate/graduate level in their selected STEM discipline.

Coursework will center on graduate-level courses in the discipline area, a common core of STEM Education courses, and elective courses focused on research training. The candidate's dissertation research will be supervised by an interdisciplinary team of faculty and will investigate teaching and learning within/across one or more STEM disciplines.

Although interdisciplinary in nature, graduate students in the STEM Education PhD Program will have an academic home in the STEM department/program of their discipline preference. Graduate committee membership will include faculty from the STEM Education program and from the department/program of discipline preference.

The STEM Education PhD program works in collaboration with (a) existing educational research programs in STEM disciplines (e.g., Biological Sciences); (b) NDSU's College Teaching Certificate Program; and (c) extramurally-funded STEM educational research projects already established at NDSU.

Program Requirements

Applicants must have a Masters Degree or equivalent in Education or a STEM discipline for full admission. The program requires 60 semester hours beyond the Masters Degree. Additionally, by completion of the doctorate, the coursework must include either a Masters Degree or its equivalent coursework in the chosen STEM discipline (this applies if the Masters Degree is in Education or another related field). In consultation with the student's graduate committee, a plan of study will be developed to ensure that the student has a strong background in (a) curriculum, teaching, learning, and assessment; (b) educational research; and (c) content expertise within their discipline.

Core Didactic Courses (9 SH):

- STEM 704: STEM Curriculum & Assessment (3 SH)
- Education 705: Teaching College Science (3 SH)
- STEM 706: Research Methods in STEM (3 SH)

Educational Research Seminar

(continuing enrollment throughout program, each Fall & Spring semester):

- Education 790: Seminar: Research in STEM Education (1 SH)

Elective Graduate Courses in STEM Discipline and/or Education

(minimum of 18 SH, to meet minimum of 27 SH coursework requirement):

- Didactic courses selected with approval of the graduate committee to strengthen preparation in the STEM discipline, educational research, and/or in education.

Doctoral Dissertation (minimum 9 SH):

- Education 799: Doctoral Dissertation (1-15 SH)

Students enrolled in program must maintain an overall GPA of at least 3.0 both within the content area and the education courses. If the GPA in either component should drop below 3.0, then the student is placed onto probation within the program for the following semester. If at the end of that semester the GPA still remains below 3.0, the student is subject to dismissal from the program.

Sociology

Program and Application Information

Department Chair:	Dr. Gary Goreham
Department Location:	107 Reinke Visual Arts Gallery
E-mail Address:	ndsu.soc.anth@ndsu.edu
Telephone Number:	(701) 231-8657
Degree Offered:	M.S.
Application Deadline:	April 1 to be considered for assistantships, but applications are accepted for fall, spring, and summer semesters
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

The Department of Sociology and Anthropology offers the M.S. degree in Sociology. This program is based on the principle that graduate level education in Sociology is a desirable preparation for a growing number of career orientations. Sample positions that our graduates have obtained include research analyst, instructor and human service worker. The precise plan of study for each student will be established in consultation with the academic adviser with the student's career goal in mind.

The focus of graduate education in Sociology is directed toward both the development of applied sociologists and the advanced training of those seeking to pursue a doctoral degree. Students may elect to take courses in a specialty area, or they may pursue a background in general sociology. Areas of specialization include medical sociology/ gerontology and community development.

The Sociology graduate program provides students with the opportunity to expand their background and perspectives in research methods and theory. Consequently, the first year of the program is designed to expose students to theory and both quantitative and qualitative research methods.

Two program options are available for students. In the thesis option, students work on a research-based thesis. Students typically test theoretical assumptions using primary or secondary data. The comprehensive study option is designed for students who wish to combine their studies with some type of specialized field experience. Students electing this option are required to complete a comprehensive study paper related to their internship, such as evaluating a program.

Students in the Sociology graduate program benefit from a favorable faculty-to-student ratio.

Faculty

Gina Aalgaard Kelly, Ph.D.
University of Minnesota, 2007
Research Interests: Medical and Aging Sociology

Pamela Emanuelson, Ph.D.
University of South Carolina, 2008
Research Interests: Small Group Processes, Social Psychology, Mathematical Sociology. Economic Sociology, Sociopolitical Evolution

Gary A. Goreham, Ph.D.
South Dakota State University, 1985
Research Interests: Rural Sociology, Community, Family, Research Methods, Sociology of Religion, Sociology of Agriculture

Richard W. Rathge, Ph.D.
Michigan State University, 1981
Research Interests: Demography, Applied Sociology, Rural Sociology, Research Methods

Joy Sather--Wagstaff, Ph.D.
University of Illinois at Urbana- Champaign, 2007
Research Interests: Cultural Anthropology, Visual Sociology, Race, Class and Gender, Death and Dying, Disaster

Christina D. Weber, Ph.D.
SUNY--Buffalo, 2005
Research Interests: Social Theory, Feminist Theory, Sociology of Gender, Memory and Trauma Studies, Social Change

Christopher M. Whitsel, Ph.D.
Indiana University, 2009
Research interests: Social Inequality, Research Methods, Global Comparative Sociology, Post-Soviet Central Asia

Emeritus

H. Elaine Lindgren, Ph.D.
University of Missouri, 1970
Research Interests: Social Change, Gender, Citizen Participation

Joy M. Query, Ph.D.
University of Kentucky, 1960
Research Interests: Medical Sociology, Theory, Mental Health

William Sherman, M.A.
University of North Dakota, 1965
Research Interests: Great Plains, Sociology of Religion, Regional Studies

Kathleen Slobin, Ph.D.
University of California--San Francisco, 1991
Research Interests: Medical Sociology, Sociological Theory, African Studies, Feminist Theory

Admissions Requirements

The Department of Sociology and Anthropology graduate program is open to qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements on page 5, the applicant must have earned a cumulative grade point average in all courses of at least 3.0 or equivalent and a grade point average of 3.2 or higher in sociology.

Financial Assistance

Teaching assistantships are available to qualified applicants. Research assistantships may also be available, contingent on faculty research funds. Applicants for assistantships are considered on the basis of scholarship and potential to undertake advanced study and research. To be considered for an assistantship, a completed Graduate School application, official transcripts, and three letters of reference must be received by the Graduate School no later than April 1.

Degree Requirements

Students must complete a minimum of 30 credits and a master's thesis for the thesis option, or a minimum of 35 credits and a paper for the comprehensive study option. An oral defense of the thesis or the paper is required.

Requirements for the M.S. degree in sociology are as follows:

1. Successfully complete
   SOC723 Social Theory
   SOC 700 Qualitative Methods
   SOC701 Quantitative Methods
2. Complete an additional 21 credits (including thesis) or 26 credits (including comprehensive study).
3. Complete a research-based thesis or comprehensive study paper, and pass an oral defense of the thesis or paper administered by the student's supervisory committee.

Software Engineering

Program and Application Information

Department Head:	Dr. Brian Slator
Graduate Coordinator:	Dr. Kendall Nygard
Department Location:	258 IACC
Email:	Kenneth.Magel@ndsu.edu
Telephone Number:	(701) 231-8562
Degrees Offered:	Ph.D., M.S., Certificate
Application Deadline:	April 1 for Summer and Fall, August 1 for Spring
Test Requirements:	GRE (M.S. and Ph.D.)
English Proficiency Requirements:	TOEFL ibT 79 IELTS 6

Program Description

Software Engineering is focused on the application of systematic, disciplined, and quantifiable approaches to the development, operation, and maintenance of software systems. Inclusive of computer programming but going well beyond, Software Engineering is concerned with methodologies, techniques, and tools to manage the entire software life cycle, including development of requirements, specifications, design, testing, maintenance, and project management. The advent of Software Engineering is a natural result of the continuous quest for software quality and reusability, and the maturing of the software development industry.

The Department of Computer Science offers a Graduate Certificate, M.S., and Ph.D. in Software Engineering. The programs are designed to appeal to both full-time students and software professionals who are employed and wish to pursue a program part time. Minimum qualifications for admission are the same as those specified for advanced degrees in Computer Science. For additional information, see www.cs.ndsu.nodak.edu or contact the Director of Software Engineering (701) 231-8189. For a complete listing of courses and faculty, please refer to the Computer Science section.

Admissions Requirements

In addition to the Graduate School requirements found on page 5, applicants must fulfill the program requirements listed below:

Certificate

1. B.S. or equivalent degree from an accredited university;
2. Twelve semester hours or equivalent of Computer Science or Software Engineering courses from an accredited university, or at least one year full-time professional software engineering experi-

Faculty

Anne Denton, Ph.D.
University of Mainz, 1996
Research Interests: Data Mining, Bioinformatics, Scientific Informatics, Educational Technology, Model Building, Databases

Hyunsook Do, Ph.D.
University of Nebraska, 2007
Research Interests: Software Engineering, Software Testing, Maintenance, and Empirical Methodologies

Dean Knudson , Ph.D.
Northwestern University, 1972
Research Interests: Software Development and Management

Jun Kong , Ph.D.
University of Texas, Dallas, 2005
Research Interests: Software Engineering; Human-Computer Interaction; Model Management

Kenneth Magel, Ph.D.
Brown University, 1977
Research Interests: Software Engineering, Human-Computer Interfaces, Computer Networks, Subsymbolic Computation

John Martin, Ph.D.
Rice University, 1971
Research Interests: Theoretical Computer Science, Theory of Computation

Kendall Nygard, Ph.D.
Virginia Polytechnic Institute and State University, 1978
Research Interests: Electronic Commerce, Software Agents, Operations Research, Sensor Networks, Artificial Intelligence

William Perrizo, Ph.D.
University of Minnesota, 1972
Research Interests: Distributed Database Systems, Centralized Database Systems

Brian Slator, Ph.D.
New Mexico State University, 1988
Research Interests: Artificial Intelligence, Educational Games

Vasant Ubhaya, Ph.D.
University of California-Berkeley, 1971
Research Interests: Algorithm Analysis, Operations Research

ence;
3. Programming skill in a modern higher level programming language, preferably C++, C#, or Java.

Master of Science

1. B.S. or equivalent degree from an accredited university with at least a 3.0 grade point average on a 4.0 scale. Full-time professional experience may offset this GPA requirement at the rate of 0.1 in GPA for each eighteen months of such experience to a maximum of 0.4 in GPA;
2. Eighteen semester hours or equivalent in Computer Science from an accredited institution, or at least two years of full-time professional software engineering experience;
3. Programming skill with one modern higher level programming language, preferably C++, C#, or Java.

Doctor of Philosophy

1. B.S. or equivalent degree from an accredited university with at least a 3.25 grade point average on a 4.0 scale. Significant full-time software development professional experience may offset this GPA requirement at the rate of 0.1 in GPA for each two years of such experience to a maximum of 0.4 in GPA;
2. Eighteen semester hours or equivalent in Computer Science from an accredited institution, or at least three years of full-time professional software engineering experience;
3. Programming skill in at least one higher level programming language, preferably C++, C#, or Java.

Degree Requirements

Graduate Certificate

- Requires 10 semester credit hours consisting of
  - CSCI 713 Software Development Processes

    Any two of the following five courses:
  - Computer Science 714, Software Project Planning and Estimation
  - CSCI 715 Software Requirements Definition and Analysis
  - CSCI 716 Software Design
  - CSCI 717 Software Construction
  - CSCI 718 Software Testing and Debugging
- One CSCI 790 seminar in an appropriate area as approved by the student's adviser. Examples include:
  - Database Systems
  - Extreme Programming
  - Formal Methods in Software Engineering
  - Intelligent Agents
- An extensive project of approximately one third of a semester incorporated into whichever of the above courses the student and her (his) adviser selected. The project may be job related. This project serves as the capstone experience for the student.

  Sample Certificate Combinations:
  Software Design: CSCI 713, 715, 716 + Seminar with project in 716
  Software Testing: CSCI 713, 714, 718 + Seminar with project in 718.
  Software Project Management: CSCI 713, 714, 715 + Seminar with project in 715.
  Software Construction: CSCI 713, 716, 717 + Seminar with project in 716 or 717.
  Other arrangements could be done as well.

Emeritus

Bruce Erickson, Ph.D.
Yale University, 1973
Research Interests: Theoretical Computer Science, Graph Theory

Robert Gammill, Ph.D.
Massachusetts Institute of Technology

Master of Science in Software Engineering

- Program Requirements (33 semester hours)
- The Software Engineering Core (12 credits): Students must complete the core within five semesters of their entering the program.
  - CSCI 713: Software Development Processes
  - CSCI 765: Introduction to Database Systems
  - CSCI 716: Software Design
  - Either CSCI 715: Software Requirements Definition, or CSCI 718: Software Testing and Debugging. Each student selects one of these two courses.
- The Software Engineering Comprehensive Examination. This examination shall include integrative questions on the four courses which make up the software engineering core (see 1 above). The exam must be passed within the first seven semesters of their program. Each student is allowed a maximum of two attempts to pass this examination. Students are encouraged to complete the comprehensive examination early in their program.
- Six credits (not part of the core) from:
  - CSCI 714 Software Project Planning and Estimation
  - CSCI 715 Software Requirements Definition
  - CSCI 717 Software Construction
  - CSCI 718 Software Testing and Debugging
  - CSCI 747 Software Complexity Metrics
  - CSCI 745 Formal Methods for Software Development
  - CSCI 746 Development of Distributed Applications
- Nine credits of other Computer Science or Computer Engineering courses selected with and approved by the student's graduate advisory committee.
- Three CSCI 790 graduate seminars in software engineering areas (1 credit each). These seminars must be approved in advance by the student's graduate adviser (a form is provided for this purpose).
- A comprehensive study option (3 credits) paper based on a significant software development project undertaken by the student, perhaps as a member of a team, either at the University or as part of a job. This project will require design, implementation, and testing of a significant piece of computer software.
- A Final Oral Examination on the paper and course work. This examination shall include questions on design choices, implementation methods, and testing choices for the student project.

Ph.D. in Software Engineering

Program Requirements (90 semester hours)

- All M.S. course requirements (items 1,3,4, and 5 above) or their equivalent in transfer or examination credits.
- CSCI 793 Software Development Project (6 semester hours). This course will require the design, implementation, and testing of a significant piece of computer software. This course must be completed successfully before the Qualifying Examination may be attempted. If a student successfully passed the M.S. in Software Engineering Comprehensive Examination at the Ph.D. qualifying level while earlier completing an M.S. at North Dakota State University, the student shall not need to take the Qualifying Examination, but this course must be completed successfully within the first two years of the Ph.D. program.
- Satisfactory completion of the Ph.D. Qualifying Examination. This examination will consist of integrative questions on the four core courses described in (1) under the M.S. above. Students must complete this requirement within their first seven semesters of participation in the program.
- Twelve hours of course work chosen from the courses listed below and not duplicating any items used to satisfy 1:
  - CSCI 714 Software Project Planning and Estimation
  - CSCI 715 Software Requirements Definition

  - CSCI 716 Software Design
  - CSCI 717 Software Construction
  - CSCI 718 Software Testing and Debugging
  - CSCI 747 Software Complexity Metrics
  - CSCI 745 Formal Methods for Software Development
  - CSCI 746 Development of Distributed Applications
- Six hours of additional course work in Computer Science or Computer Engineering chosen by the student and his advisor and approved by the Student's Advisory Committee.
- Thirty-six semester credit hours for research, preparation, and defense of a dissertation in Software Engineering. These hours will be graded on a Satisfactory/Unsatisfactory basis.

Additional course work requirements:

1. Beyond the M.S. degree, a maximum of 9 credits of course work can be transferred.
2. The 90 credits may include a maximum of 15 credits of non-didactic courses (independent studies and seminar hours). Seminars are limited to four of those credits.

The student's advisory committee, the department chair, and the graduate dean all must approve the course work on the plan of study at least two semesters before graduation

Soil Science

Program and Application Information

Program Leader: Dr. Tom DeSutter
Department Location: 106 Walster
Email: Thomas.DeSutter@ndsu.edu
Telephone Number: (701) 231-8901
Degrees Offered: Ph.D., M.S.
Application Deadline: International applications are due May 1st for fall and August 1 for spring and summer semesters. Domestic applicants should apply at least one month prior to the start of classes.
English Proficiency Requirements: TOEFL ibT 71
IELTS 6

Program Description

The Department of Soil Science in the School of Natural Resource Sciences offers graduate study leading to the M.S. and Ph.D. degrees that provide training in agricultural and/or environmental career tracks. The instructional and research programs emphasize an understanding of soil-plant-atmosphere interactions and their application to soil and water resource management. Students may pursue degrees with emphasis in soil chemistry, soil fertility, soil genesis and morphology, soil management, soil physics, environmental modeling, water quality, soil salinity, plant nutrition, soil survey, soil conservation, soil reclamation, soil mineralogy or agricultural climatology and meteorology . M.S. and Ph.D. programs in Natural Resources Management and Environmental and Conservation Science with emphasis in soil science are also available.

A close working relationship exists between the department and various state and federal agencies and the private sector. Strong supporting course work is available from other departments and programs at North Dakota State University. Programs of study are designed to meet student interests and needs.

North Dakota's diversity of soils and agricultural practices provides an exceptional field setting in which to study soil science. The department is well equipped for field and laboratory investigations.

Admissions Requirements

The Soil Science graduate program is open to all qualified graduates of universities and colleges of recognized standing. All applicants must meet the Graduate School requirements listed on page 5.

Faculty

F. Adnan Akyuz, Ph.D.
University of Missouri-Columbia, 1994
Research Area/Activity: Applied Climatology and Microclimatology/Climate Based Agricultural Management

Francis X.M. Casey, Ph.D.
Iowa State University, 2000
Research Area/Activity: Field Oriented Soil Physics, Measurement and Prediction of Water Transfer and Chemical Transport Through Soil

Amitava Chatterjee, Ph.D.
University of Wyoming, 2007
Research Area/Activity: Soil Fertility Management, Greenhouse Gas Emissions

Larry J. Cihacek, Ph.D.
Iowa State University, 1979
Research Area/Activity: Erosion and Productivity Relationships, Conventional and Alternative Crop Management, Carbon Sequestration, Nutrient Management

Thomas M. DeSutter, Ph.D.
Kansas State University, 2004
Research Area/Activity: Trace Elements, Land Application of Byproducts, Inorganic Soil Chemistry, Soil Environmental Conditions

Ann-Marie Fortuna, Ph.D.
Michigan State University , 2001
Research Area/Activity: Microbial and soil process regulating nutrient cycling, soil health and global climate change in agricultural and grassland systems. Use of soil health indicators as a measure of the effectiveness of remediation and land management strategies in saline and sodic soils.

David W. Franzen, Ph.D.
University of Illinois, 1993
Research Area/Activity: Soil Fertility/ State Soil Specialist

R. Jay Goos, Ph.D.
Colorado State University, 1980
Research Area/Activity: Soil Fertility and Management/Fertilizer Management for Small Grains

David G. Hopkins, Ph.D.
North Dakota State University, 1997
Research Area/Activity: Interactions Among Landscape, Soil Morphology, Soil Properties and Environmental Aspects of Land Use

Financial Assistance

Research assistantships are available. Applicants are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need. To be considered for an assistantship,
applicants must submit a completed application. A complete application will include three recommendations, transcripts and a scholarly writing example. A TOEFL score for international ap licants must also be received by the Graduate School.

Degree Requirements

The M.S. program normally requires 24 months of full-time study and research while the Ph.D. program normally requires a minimum of 36 months. An overall GPA of 3.0 or better must be maintained. An oral defense of thesis and academic subject matter is required of M.S. candidates. Ph.D. candidates are required to take a preliminary written and oral examination of academic subject matter and a final oral defense of a research-based dissertation.

Abbey Wick, Ph.D.
University of Wyoming, 2007
Research Area/Activity: Soil Health in Agricultural and Range Lands; Mine Reclamation

Adjunct Faculty

Allan W. Cattanach, Ph.D.
University of Minnesota, 1979
Research Area/Activity: Soil Fertility, Sugarbeet Management

Gary H. Halvorson, Ph.D.
Oregon State University, 1979
Director of Agriculture, Sitting Bull College, Fort Yates, SD

Mark Liebig, Ph.D.
University of Nebraska, 1998
USDA-ARS Northern Great Plains Research Laboratory, Mandan, ND
Research Area/Activity: Soil Quality, Soil Carbon Dynamics, Greenhouse Gas Flux, Semiarid Agroecosystems

Stephen D. Merrill, Ph.D.
University of California, Riverside, 1976
USDA-ARS Northern Great Plains Research Laboratory, Mandan, N.D.
Research Area/Activity: Soil Erosion Processes; Crop Root Growth and Soil/Crop Hydrology; Mined Land Reclamation

Kristine Nichols, Ph.D.
University of Maryland, 2003
USDA-ARS Northern Great Plains Research Laboratory, Mandan, ND
Research Area/Activity: Soil Microbiology and Aggregate Stability

Laura F. Overstreet Gentry, Ph.D.
North Carolina State University, 2005
Assistant Professor, University of Illinois Urbana-Champaign
Research Area/Activity: Soil Fertility, Grain Crops, Bioenergy Crops, Crop Management, Environmental Systems

Jimmie L. Richardson Ph.D.
Iowa State University, 1974
Research Area/Activity: Soil Salinization, Soil Development in Wetlands, Hydrologic Patterns, Sedimentation

James A. Staricka, Ph.D.
University of Minnesota, 1990
Williston Research Extension Center,
Research Area/Activity: Soil and Water Conservation and Nutrient Use Efficiency in Dryland and Irrigated Crop Production

Donald L. Tanaka, Ph.D.
University of Nebraska, 1980
USDA-ARS Northern Great Plains Research Laboratory, Mandan, ND
Research Area/Activity: Dryland Integrated Agricultural Systems, Soil and Crop Ecological Interactions

Statistics

Program and Application Information

Department Chair:	Dr. Rhonda Magel
Department Location:	Waldron Laboratory
Email:	ndsu.stats@ndsu.edu
Telephone Number:	(701) 231-7177
Degrees Offered:	Ph.D., M.S., Certificate
Application Deadline:	Application deadline is March 15 for international students and applicants who would like an opportunity for an assistantship if available
Test Requirements:	GRE (recommended)
English Proficiency Requirements:	TOEFL ibT 79 IELTS 6

Faculty

Ron Degges, Ph.D.
North Dakota State University, 2011
Field: Sampling, Regression Analysis

Seung Won Hyun, Ph.D.
University of Missouri, 2010
Field: Optimal Designs, Adaptive Designs, Clinical Trials

Rhonda Magel, Ph.D.
University of Missouri-Rolla, 1982
Field: Nonparametrics, Inference Under Order Restrictions, Regression

Megan Orr, Ph.D.
Iowa State University, 2012
Field: Biostatistics, Gene Expression Analysis, High-Dimensional Data, Analysis and Multiple Testing

Gang Shen, Ph.D.
Purdue University, 2009
Field: Mathematical Statistics, Asymptotic Theory, Bayesian Analysis, Change-Point Problem

Yarong Yang, Ph.D.
Northern Illinois University, 2010
Field: Machine Learning, Spatial Statistics, Bayesian Statistics, Bioinformatics

Program Description

The Department of Statistics offers programs leading to a Ph.D. in statistics or a master's degree in applied statistics. The program is flexible enough to be individually planned around prior experience and in accord with professional goals.

During the first year of the program, students are strongly encouraged to meet with each faculty member to discuss possible research topics. The student should select an advisory and examining committee by the end of the first year.

A joint master's degree in computer science and statistics may also be obtained. A graduate certificate in Applied Statistics for non majors is also offered.

Admissions Requirements

Graduate Certificate

- B.S. or equivalent degree from an accredited university,
- Knowledge of College Algebra

Master's Program in Applied Statistics

The Department of Statistics' graduate program is open to qualified graduates of universities of recognized standing. In addition to the Graduate School requirements found on page 5, the applicant must :

- Have had at least one year of calculus,
- Have had at least one course in statistics,
- Have had at least one programming language and

Joint Master's Program in Computer Science and Statistics

To be admitted with full status into the M.S. program in computer science and statistics, the applicant must satisfy the admission requirements for both the M.S. program in computer science and the M.S. program in applied statistics.

Ph.D. Program in Statistics

In addition to the Graduate School requirements found on page 5, the applicant must :

- Have had four courses in math at the university calculus level or above,
- Have had several courses in statistics,
- Have had at least one programming language

Students not holding a master's degree in statistics or a closely related field will not be admitted to the Ph.D. program in statistics. These students must first apply to the M.S. program in applied statistics and complete the M.S. degree.

Ph.D. Program in Statistics (with Emphasis in Sports Statistics)
In addition to the Graduate School requirements found on page 5, the applicant must:

- Have had four courses in math at the university calculus level or above.
- Have had several courses in statistics.
- Have had a least one programming language.

Students entering program with this option can be admitted directly into the Ph.D. program after receiving B.S. degree. Students holding M.S. degree may also apply.

Financial Assistance

Teaching assistantships are available. To be considered for an assistantship, the application must be complete with the Graduate School no later than March 15.

Degree Requirements

Graduate Certificate
Requires 12 Semester credit hours consisting of STAT 725, STAT 726, and two other pre-approved graduate level courses in statistics. After completing the requirements for the certificate, please contact the Department of Statistics to verify completion.

M.S. Degree in Applied Statistics
The program for the M.S. degree in applied statistics requires 32 semester credits with an overall GPA of 3.0 or higher. An oral defense of a research-based thesis or paper is required. The program for the M.S. degree in computer science and statistics requires 42 semester credits with an overall GPA of 3.0 or higher. An oral defense of a research-based thesis or paper is required.

All students must :
1. Complete a set of core courses with a grade of B or better, including STAT 661, 662, 767, 768, 764 or 774,
2. Successfully complete 2 one-credit practicums in consulting. Each statistical practicum will be listed as STAT 794,
3. Complete an additional 9-12 hours (depends on number of research hours) of course work selected from the following courses: STAT 650, 651, 660, 663, 664, 665, 670, 730, 732, 750, 761, 762, 770, 772, 777, 778, 780, 786, 796 (Special Topics in Statistics). At most, two of the following courses will count in the additional 9-12 hours: CSci 618, 654, 737; Math 650, 688, 728. A plan of study must be submitted.
4. Pass two written comprehensive exams. Exam 1 covers STAT 767 and 768. Exam 2 covers STAT 661, 662, and 764 or 774. Exam 1 is two hours, and Exam 2 is three hours. These exams are offered approximately the fourth week of Fall and Spring Semesters. A maximum of two attempts will be allowed, and
5. Successfully complete and defend a research-based thesis or paper.

M.S. Degree in Computer Science and Statistics

All students must :

1. Take a minimum of 42 semester credit hours, including at least 18 graduate course credits in computer science and at least 18 graduate course credits in statistics,
2. Take CSci 708, 713, 724, 737, 765, and one additional 600- or 700-level course in computer science,
3. Take STAT 661, 662, 767, 768, 764 or 774, and one additional 600- or 700-level course in statistics (does not include STAT 725 or STAT 726),
4. Pass both the comprehensive exams for the M.S. degree in computer science and the M.S. degree in statistics, and
5. Successfully complete a research-based thesis or paper. The supervisory committee must consist of at least one faculty member from computer science and at least one faculty member from statistics.

Ph.D. Degree in Statistics*

The program for the Ph.D. degree requires an additional 30 credits of course work beyond the M.S. degree and 30 hours of research. An oral defense of a dissertation is required. All students must :

1. Complete a set of core courses with a grade of B or better, including STAT 661, 662, 767, 768, 764 or 774,
2. Successfully complete 6 one-credit practicums in Consulting/Presentation Practicum. Each statistical practicum will be listed as STAT 794,
3. Complete an additional 30 semester credits of statistics courses at the 600- or 700-level (does not include STAT 725 or STAT 726). At least 15 credits must be at the 700-level. All Ph.D. students must complete STAT 786,
4. Complete 9 semester credits from the following: Math 650, 651, 688, 689, 728; CSci 654, 737. This requirement may be waived and additional courses in statistics substituted upon approval by the adviser and advisory committee. A plan of study must be submitted,
5. Pass a written comprehensive exam. This exam consists of two sections. It is given twice a year during approximately the fifth week of each Semester. A maximum of two attempts is allowed,
6. Submit a research proposal and pass an oral exam on the proposal and related topics, and
7. Complete and successfully defend the research dissertation.

*Some of these requirements may be satisfied upon admittance into the program with an already existing M.S. degree in Statistics.

Ph.D. in Statistics (with Emphasis in Sports Statistics)

This program does require 41 credits in course work, 6 credits in an internship, 3 credits in seminars, and 30 credits in research beyond the B.S. degree. Students in this program must:

1. Complete a set of core courses with a grade of B or better which includes STAT 661, STAT 662, STAT 767, STAT 768, STAT 764, and STAT 774.
2. Complete 6 additional courses including STAT 650, STAT 651, STAT 663, STAT 664, STAT 671, and STAT 775.
3. Complete 15 credits of Electives in Graduate Statistics Courses (These could include STAT 660, STAT 670, STAT 672, STAT 761, STAT 772, among others.
4. Successfully complete 3 one-credit seminars in sports statistics, STAT 790.
5. Successfully complete an internship with a sports team for two seasons (a student could also work with two different sports teams - one for each season) – STAT 794 (6 credits)
6. Pass a written comprehensive exam. This exam consists of two sections over the set of core courses and is given twice per year. A maximum of two attempts is allowed.
7. Submit a research proposal in the area of sports statistics and pass an oral exam on the proposal and related topics
8. Complete and successfully defend the dissertation in sports statistics.

Note: A student may also enter this program after receiving an M.S. degree is Statistics or closely related field. Previously taken courses will be evaluated to determine their fit into this program.

Transportation and Logistics

Program and Application Information

Program Director:	Dr. Denver Tolliver
Assistant to the Director of Educational Programs:	Jody Bohn
Program Location:	Upper Great Plains Transportation Institute
Email:	Jody.Bohn@ndsu.edu
Telephone Number:	(701) 231-7938
Degree Offered:	Ph.D.
Application Deadline:	May 1 for fall semester and October 1 for spring semester
Test Requirements:	GRE (required without M.S. degree)
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

North Dakota State University offers an interdisciplinary program leading to the Ph.D. degree in Transportation and Logistics (TL). The Transportation and Logistics program is a joint effort of the Colleges of Agriculture, Food Systems, and Natural Resources; Business Administration; Engineering and Architecture; as well as the Upper Great Plains Transportation Institute. The following departments are participating in the program: Agribusiness and Applied Economics; Civil Engineering; Construction Management and Engineering; Industrial and Manufacturing Engineering; and Management, Marketing, and Finance; and Emergency Management

The TL doctoral program allows students to develop advanced knowledge and research skills in the rapidly growing fields of transportation and logistics. The Ph.D. program consists of three main components: a core curriculum, an area of concentration, and a dissertation. After completing the interdisciplinary core curriculum, students may enter one of three areas of concentration: 1) Logistics and Supply Chain Systems, 2) Transportation Economics and Regulation, and 3) Transportation Infrastructure and Capacity Planning.

Admissions Requirements

The Transportation and Logistics Ph.D. program is open to qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements listed on page 5, the applicant must have adequate preparation in one or more of the disciplines comprising Transportation and Logistics and have a stated interest in transportation and the capability to conduct transportation research.

Students who do not meet all requirements for admission or have de-

Faculty

Canan Bilen-Green, Ph.D.
University of Wyoming, 1998
Research Interests: vQuality and Reliability Engineering, Design and Auditing of Quality and Productivity Monitoring Systems, Statistical Modeling and Applications, Applied Operations Research
Department: Industrial and Manufacturing Engineering

John Bitzan, Ph.D.
University of Wisconsin-Milwaukee, 1997
Research Interests: Transportation Economics
Department: Management, Marketing and Finance

Jarret Brachman, Ph.D.
University of Delaware, 2006
Research Interests: Al-Qaida Strategy, Counterterrorism, Transportation Security

Robert Hearne, Ph.D.
University of Minnesota, 1995
Research Interests: Natural Resource and Environmental Economics
Department: Agribusiness and Applied Economics

Siew Hoon Lim, Ph.D.
University of Georgia, 2005
Research Interests: Production Economics, Transportation, Industrial Organization
Department: Agribusiness and Applied Economics

Jill Hough, Ph.D.
University of California-Davis, 2007
Research Interests: Public Transportation, Travel Behavior, Built Environment, Accessibility and Mobility of Seniors
Department: UGPTI

Won Koo, Ph.D.
Iowa State University, 1974
Research Interests: International Trade
Department: Agribusiness and Applied Economics

Brenda Lantz, Ph.D.
Pennsylvania State University, 2006
Research Interests: Commercial vehicle safety systems and analysis, supply chain, intelligent transportation systems for commercial vehicle operations, and statistical modeling and diagnostics.
Department: UGPTI

ficiencies in prerequisite course work, but show satisfactory potential for graduate study, may be admitted conditionally. The conditional status may be changed to full graduate standing after the first or second semester of study, based on the student's academic performance.

A student wishing to pursue an area of concentration in Transportation Economics and Regulation must have completed intermediate-level microeconomics and taken at least one course in macroeconomics. In order to pursue an area of concentration in Logistics and Supply Chain Systems, a student must have earned a baccalaureate degree in Agribusiness, Business, Economics, Finance, Industrial Engineering, Management, Marketing, or a related field. All applicants must meet the general program prerequisites of at least one year of calculus, at least one course in statistics and economics, and an expressed interest in transportation. Preference will be given to students with prior transportation coursework and relevant research experience.

Financial Assistance

The number of assistantships vary from year to year, depending on grant availability and the number of students in residence. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research.

To be considered for an assistantship, the student must complete a Graduate School application, be accepted by the department, and identify the desire for an assistantship or financial need in the applicants statement of purpose. The applicant must also include with his/her application an official GRE or GMAT score to be considered for an assistantship.

Graduate tuition is waived for students with qualifying assistantships.

Degree Requirements

The Ph.D. program requires the completion of a minimum of 90 credits of graduate study beyond the baccalaureate degree with an overall GPA of 3.0 or higher. Each student must develop a plan of study under the guidance of a faculty adviser and a supervisory committee. Twenty-five of the graduate credit hours must consist of core Transportation and Logistics courses or suitable substitutes. A minimum of 30 credit hours must consist of research-based dissertation credits. In addition, a minimum number of credit hours must be taken in the student's area of concentration, including quantitative methods courses related to the concentration. The remaining credits may be comprised of technical electives and additional dissertation credits.

Students must pass the comprehensive/preliminary examination after the majority of the coursework has been completed. The compre-

Subhro Mitra, Ph.D., P.E.
North Dakota State University, 2007
Research Interests: Freight Travel Demand modeling, Urban Travel Demand Modeling, Asset Management and Life-Cycle Cost Study Optimizing Logistics Network, Economic Appraisal of Infrastructure Investment

Peter O'Dour, Ph.D.
University of Missouri-Rolla, 2004
Research Interests: GIS, Groundwater contamination, Remote sensing
Department: Geosciences

Joseph Szmerekovsky, Ph.D.
Case Western Reserve University, 2003
Research Interests: Project management and scheduling, Complex systems and flexible manufacturing and using linear and nonlinear dynamic and integer programming and network flows
Department: Management, Marketing and Finance

Denver D. Tolliver, Ph.D.
Virginia Polytechnic University, 1989
Research Interests: Transportation Systems Planning, Freight Transportation, Economic Analysis
Department: UGPTI

Rodney D. Traub, Ph.D.
Purdue University, 1994
Field: Operations Management
Department: Management, Marketing, and Finance

Kim Vachal, Ph.D.
George Mason University, 2005
Research Interests: Policy, Economics, Regional Development
Department: UGPTI

Amiy Varma, Ph.D.
Purdue University, 1993
Research Interests: Transportation Systems and Planning, Traffic Engineering, Airports, and Infrastructure Management
Department: Civil Engineering

Nadim Wehbe, Ph.D.
University of Nevada, Reno, 1997
Research Interests: Reinforced and Prestressed Concrete Structures, Bridge Engineering, Earthquake-Resistant Bridges, Advanced Composites
Department: South Dakota State University, Department of Civil and Environmental Engineering

hensive exam includes written and oral components related to core transportation and quantitative concepts and to the student's area of concentration. The comprehensive exam also includes a dissertation prospectus examination in which the student must present and defend a plan for undertaking and completing a dissertation. After passing of the comprehensive exam and completion of the dissertation, the doctoral candidate must pass a final examination in which the completed dissertation is presented and defended.

Courses Offered:

TL 711 Logistics Systems
TL 715 Enterprise Resource Planning
TL 719 Crisis Analysis and Homeland Security
TL 721 International Logistics Management
TL 723 Advanced Supply Chain Planning
TL 725 Technology Advances and Logistics
TL 727 Organizational Change Management
TL 729 Adaptive Planning in Logistics
TL 731 Logistics Research Methods
TL 733 Case Studies in Logistics
TL 735 Acquisition Contracts: Law and Management
TL 751 Transportation Systems Security
TL 752 Transportation Planning and Environmental Compliance
TL 753 Transportation System Modeling
TL 754 Urban Transportation Systems Analysis
TL 755 Context Sensitive Solutions
TL 756 Transportation Systems Laboratory
TL 782 Transportation Systems I
TL 783 Transportation Systems II
TL 785 Spatial Analysis of Transportation Systems
TL 786 Public Transportation
TL 788 Research in Transportation and Logistics
TL 790 Seminar
TL 793 Individual Study
TL 796 Special Topics
TL 799 Dissertation
ENGR 770 Quantitative Modeling
ENGR 771 Probabilistic and Deterministic Methods
AGEC 771 Economics of Transportation
GEOG 655 Introduction to Geographic Information Systems
GEOG656 Advanced Geographic Information Systems

David L. Wells, Ph.D.
University of Missouri-Rolla, 1996
Research Interests: International Studies in Manufacturing Technology, Strategic Management, Economic Development Strategies
Department: Industrial and Manufacturing Engineering

William W. Wilson, Ph.D.
University of Manitoba, 1980
Research Interests: Commodity Marketing, Agribusiness, Industrial Organization
Department: Agribusiness and Applied Economics

Frank Yazdani, Ph.D., PE
University of New Mexico, 1987
Research Interests: Structural Engineering/Mechanics, Constitutive Modeling of Materials, Damage Mechanics, Plasticity, Computational Plasticity, Finite Elements, Concrete and Masonry Materials
Department: Civil Engineering

Jun Zhang, Ph.D.
Purdue University, 2006
Research Interests: Supply Chain Management, Models and Methodologies of Stochastic Optimization, Lean Manufacturing and Logistics, Healthcare Engineering, Scheduling
Department: Industrial & Manufacturing Engineering

Transportation and Urban Systems

Program and Application Information

Program Director:	Dr. Denver Tolliver
Assistant to the Director of Educational Programs:	Jody Bohn
Program Location:	Upper Great Plains Transportation Institute
Email:	Jody.Bohn@ndsu.edu
Telephone Number:	(701) 231-7938
Degrees Offered:	M.S., MTUS, Certificate
Application Deadline:	May 1 for fall semester and October 1 for spring semester
Test Requirements:	GRE (GMAT may be substituted)
English Proficiency Requirements:	TOEFL ibT 71 IELTS 6

Program Description

North Dakota State University offers an interdisciplinary program leading to a Master of Science in Transportation and Urban Systems (M.S.), a Master of Transportation and Urban Systems (MTUS) and a Certificate in Transportation and Urban Systems. The program is a collaborative effort of four colleges and includes faculty from Agribusiness & Applied Economics; Civil Engineering; Computer Science and Operations Research; Emergency Management; Industrial Engineering; Management, Marketing & Finance; and the Upper Great Plains Transportation Institute.

Master of Science (M.S.) in Transportation & Urban Systems
This degree focuses on: (1) urban transportation systems;(2) relationships between transportation, land use, environment, emergency response, and logistical delivery systems; (3) coordinated planning, operations, and security; and (4) the spatial dimensions of urban systems. The curriculum is built around the topics of: public transportation systems, geographic information systems, freight transportation and logistical delivery systems, urban geography and land use, the environmental impacts of transportation systems, transportation systems security, and the sustainability of transportation and urban systems. Because the M.S. degree requires a thesis, it is targeted at students with strong research interests.

Master of Transportation & Urban Systems (MTUS)
This is a non-disquisition degree that is primarily intended for professional planners and engineers. Students in the M.S. and MTUS programs can select from a common set of courses. However, students enrolled in the non-disquisition (MTUS) program have more opportunities for synthesis of practice and additional course work, with less emphasis on research.

Faculty

Canan Bilen-Green, Ph.D.
University of Wyoming, 1998
Research and Reliability Engineering, Design and Auditing of Quality and Productivity Monitoring Systems, Statistical Modeling and Applications, Applied Operations Research
Department: Industrial and Manufacturing Engineering

John Bitzan, Ph.D.
University of Wisconsin-Milwaukee, 1997
Research Interests: Transportation Economics
Department: Management, Marketing and Finance

Jarret Brachman, Ph.D.
University of Delaware, 2006
Research Interests: Al-Qaida Strategy, Counterterrorism, Transportation Security

Siew Hoon Lim, Ph.D.
University of Georgia, 2005
Research Interests: Production Economics, Transportation, Industrial Organization
Department: Agribusiness and Applied Economics

Jill Hough, Ph.D.
University of California-Davis, 2007
Research Interests: Public Transportation, Travel Behavior, Built Environment, Accessibility and Mobility of Seniors
Department: UGPTI

Won Koo, Ph.D.
Iowa State University, 1974
Research Interests: International Trade
Department: Agribusiness and Applied Economics

Brenda Lantz, Ph.D.
Pennsylvania State University, 2006
Research Interests: Commercial vehicle safety systems and analysis, supply chain, intelligent transportation systems for commercial vehicle operations, and statistical modeling and diagnostics.
Department: UGPTI

Subhro Mitra, Ph.D., P.E.
North Dakota State University, 2007
Research Interests: Freight Travel Demand modeling, Urban Travel Demand Modeling, Asset Management and Life-Cycle Cost Study Optimizing Logistics Network, Economic Appraisal of Infrastructure Investment

Certificate in Transportation & Urban Systems

The certificate in Transportation & Urban Systems is primarily targeted at practicing professionals who are unable to study in residency, but who wish to gain additional knowledge in the emerging fields of transportation and urban systems. The certificate requires a minimum of 9 course credits that can be selected from a list of on-line courses, including: Transportation Systems Security, Transportation Planning and Environmental Compliance, Transportation System Modeling, Urban Transportation Systems Analysis, Context Sensitive Solutions, and Public Transportation.

Admissions Requirements

The Transportation and Urban Systems master's program is open to qualified graduates of universities and colleges of recognized standing. In addition to the Graduate School requirements listed on page 5, the applicant must have adequate preparation in one or more of the disciplines comprising Transportation and Logistics (see below) and have a stated interest in transportation and the capability to conduct transportation research and have professional experience or interests in community practice.

Students will be accepted from many disciplinary backgrounds, including (but not limited to): architecture, business, civil engineering, environmental engineering or science, geography, government, political science, sociology, and urban affairs. However, acceptance is on an individualized basis.

Master of Science Degree Requirements

A minimum of 30 credits is required for the degree. At least 16 of these credits must be completed using approved courses numbered from 601-689, 691, 700-789. All students must take a final examination which covers the course work taken by the candidate, as well as the thesis topic.

Each thesis will contribute new models or knowledge. The former may be achieved through the synthesis of several techniques, the modification of existing models, or new applications of analytical techniques to transportation/urban problems. The latter may be accomplished through the collection and analysis of original data or the development of innovative planning techniques. Each thesis must be of sufficient depth and quality to warrant at least 6 graduate credits. However, no more than 10 credits can be earned for any thesis.

Master of Transportation & Urban Systems Degree Requirements

The Master of Transportation & Urban Systems degree will be a non-thesis degree. However, each student must complete a creative component – which can be a case study, practicum, or paper. In the creative component, a student may develop a case study of a metropolitan region, transit system, or public program. Case studies may include: (1) comprehensive transportation planning processes in metropolitan areas, (2) urban transit systems or operations, (3) emergency or dis-

Peter O'Dour, Ph.D.
University of Missouri-Rolla, 2004
Research Interests: GIS, Groundwater contamination, Remote sensing
Department: Geosciences

Joseph Szmerekovsky, Ph.D.
Case Western Reserve University, 2003
Research Interests: Project management and scheduling, Complex systems and flexible manufacturing and using linear and nonlinear dynamic and integer programming and network flows
Department: Management, Marketing and Finance

Denver D. Tolliver, Ph.D.
Virginia Polytechnic University, 1989
Research Interests: Transportation Systems Planning, Freight Transportation, Economic Analysis
Department: UGPTI

Rodney D. Traub, Ph.D.
Purdue University, 1994
Field: Operations Management
Department: Management, Marketing, and Finance

Kim Vachal, Ph.D.
George Mason University, 2005
Research Interests: Policy, Economics, Regional Development
Department: UGPTI

Amiy Varma, Ph.D.
Purdue University, 1993
Research Interests: Transportation Systems and Planning, Traffic Engineering, Airports, and Infrastructure Management
Department: Civil Engineering

Nadim Wehbe, Ph.D.
University of Nevada, Reno, 1997
Research Interests: Reinforced and Prestressed Concrete Structures, Bridge Engineering, Earthquake-Resistant Bridges, Advanced Composites
South Dakota State University, Civil and Environmental Engineering Department

David L. Wells, Ph.D.
University of Missouri-Rolla, 1996
Research Interests: International Studies in Manufacturing Technology, Strategic Management, Economic Development Strategies
Department: Industrial and Manufacturing Engineering

aster response case studies or plans, (4) security programs or issues, and (5) integrated transportation/environmental plans. The case study must be approved by the student's supervisory committee, and should involve transportation and community professionals from federal, state, or local agencies, or private industries. In lieu of a case study, the supervisory committee may approve other activities or outcomes that would comprise the creative component.

A minimum of 30 credits is required for the Master of Transportation & Urban Systems degree. At least 21 of these credits must be completed using approved courses numbered from 601-689, 691, 700-789, and 791. A maximum of 4 credits will be awarded for the creative component.

Certificate Requirements

The certificate in Transportation & Urban Systems will consist of a minimum of 9 course credits selected from the list of on-line courses. At present, this list includes: TL 751 Transportation Systems Security, TL 752 Transportation Planning and Environmental Compliance, TL 753 Transportation System Modeling, TL 754 Urban Transportation Systems Analysis, TL 755 Context Sensitive Solutions, TL756 Transportation Systems Laboratory and TL 786 Public Transportation. Additional courses may be offered on line in future years.

William W. Wilson, Ph.D.
University of Manitoba, 1980
Research Interests: Commodity Marketing, Agribusiness, Industrial Organization
Department: Agribusiness and Applied Economics

Frank Yazdani, Ph.D., PE
University of New Mexico, 1987
Research Interests: Structural Engineering/Mechanics, Constitutive Modeling of Materials, Damage Mechanics, Plasticity, Computational Plasticity, Finite Elements, Concrete and Masonry Materials
Department: Civil Engineering

Jun Zhang, Ph.D.
Purdue University, 2006
Research Interests: Supply Chain Management, Models and Methodologies of Stochastic Optimization, Lean Manufacturing and Logistics, Healthcare Engineering, Scheduling
Department: Industrial & Manufacturing Engineering

Program Requirements

Requirements for the degree will be met by each student formulating their plan of study utilizing the following courses as required.

Core Courses:
TL 751 Transportation Systems Security
TL 752 Transportation Planning and Environmental Compliance
TL 753 Transportation System Modeling
TL 754 Urban Transportation Systems Analysis
TL 755 Context Sensitive Solutions
TL756 Transportation Systems Laboratory
TL 786 Public Transportation

Electives:
TL 711 Logistics Systems
TL 721 International Logistics Management
TL723 Advanced Supply Chain Planning
TL 729 Adaptive Planning in Logistics
TL 731 Logistics Research Methods
TL 735 Acquisition Contracts: Law & Management
TL 797 Masters Paper
TL 798 Masters Thesis

Areas of Focus:

Spatial Analysis:
GEOG 655 Introduction to Geographic Information Systems
GEOG 656 Advanced Geographic Information Systems
TL 785 Spatial Analysis in Transportation

Transportation Planning:
TL788 Research in Transportation and Logistics
CE 780 Transportation Planning

Information Systems Technologies:
TL 725 Technology Advances and Logistics

Emergency Response and Disaster:
TL 719 Crisis Analysis and Homeland Security

Enterprise Management:
TL715 Enterprise Resource Planning
TL 727 Organizational Change Management

Veterinary and Microbiological Sciences

Program and Application Information

Department Head:	Dr. Charlene Wolf-Hall
Graduate Coordinator:	Dr. Penelope Gibbs
Department Location:	Van Es Hall
Telephone Number:	(701) 231-7667
Degrees Offered:	Ph.D., M.S.
Application Deadline:	February 15 for fall
Test Requirements	GRE
English Proficiency	TOEFL ibT 71
Requirements	IELTS 6

Program Description

The Department of Veterinary and Microbiological Sciences offers graduate study leading an M.S. in Microbiology, and a Ph.D. in Molecular Pathogenesis. Faculty in the department have expertise in pathogenic microbiology, virology, immunology, epidemiology, microbial genetics, bacterial physiology and food microbiology. The Master's in Microbiology emphasizes research methodology and laboratory techniques. The Ph.D. in Molecular Pathogenesis is a comprehensive program that integrates microbial genetics, mechanisms of pathogen-host interaction, and immunology to better understand the molecular basis of disease.

Admissions Requirements

In addition to the Graduate School requirements listed on page 5, applicants must have evidence of a strong academic record in the biological sciences. The following science courses are required or recommended:

Biology

- One year of general biology with laboratory (required)
- One course in genetics (required)
- At least one course in cellular biology, cellular physiology, animal physiology, or bacterial physiology (required)
- Microbiology and immunology (recommended)

Chemistry

- One year of general chemistry with laboratory (required)
- Two sequential terms of organic chemistry with a laboratory course (required)
- Biochemistry (required)

Physics

- Two sequential terms of physics with a laboratory (required)

Faculty

Peter Bergholz
Michigan State University, 2007
Research Interests: Environmental Microbiology

Teresa Bergholz
Michigan State University, 2007
Research Interests: Foodborne Pathogenesis

Eugene S. Berry, Ph.D.
Northeastern University, 1983
Research Interests: Animal virology, Molecular pathogenesis of ss(+) RNA viruses

Glenn Dorsam
Virginia Commonwealth University, 1998
Research Interests: Molecular Pathogenesis

Neil W. Dyer, D.V.M., M.S.
Iowa State University, 1991
Research Interests: Studies with Bacillus anthracis, porcine pneumonia, new malignant catarrhal fever herpesvirus

Nathan A. Fisher, Ph.D.
University of Michigan, 2006
Research Interests: Infectious Disease and Public Health

Penelope S. Gibbs, Ph.D.
University of Georgia, 2001
Research Interests: Avian E.coli, bacterial molecular pathogenesis, antimicrobial resistance, food safety

Margaret L. Khaitsa, Ph.D.
Ohio State University, 1999
Research Interests: Epidemiology, food safety

John M. McEvoy, Ph.D.
University of Ulster, 2002
Research Interests: Pathogenicity and virulence of Cryptosporidium

Birgit Pruess, Ph.D.
Ruhr-Universitat Bochum, 1991
Research Interests: Global gene regulation in enteric bacteria, complex regulatory networks

Sheela Ramamoorthy
Virginia Tech, 2006
Research Interests: Virology and Vaccinology

Jane M. Schuh, Ph.D.
North Dakota State University, 2000
Research Interests: Immunology; biomedical significance of the initiation and maintenance of allergic asthma; the innate immune response in health and disease; murine models of human asthma; Aspergillus fumigatus -induced immune response

Charlene E. Wolf-Hall, Ph.D.
University of Nebraska-Lincoln, 1995
Research Interests: Food microbiology and toxicology

Financial Assistance

The student must first apply to the Graduate School and be accepted in full or conditional status before he/she is eligible for an assistantship. Research and teaching assistantships are contingent upon availability of funds and are awarded competitively. Applicants are considered on the basis of scholarship, potential to undertake advanced study and research, and financial need.

Ph.D. in Molecular Pathogenesis

The Ph.D. in Molecular Pathogenesis encompasses the study of molecular pathogenesis of infectious and non-infectious diseases with an emphasis on zoonotic diseases and public health. The comprehensive Doctoral degree in Molecular Pathogenesis integrates the study of microbial genetics, mechanisms of pathogen-host interaction, and cellular immunology to better understand the molecular basis of disease. Doctoral candidates in Molecular Pathogenesis focus on research and utilize the expertise of one or more departmental faculty members. Course work is designed to be relevant to future careers in academia, industry, and government.

Degree Requirements
Degree requirements are in agreement with NDSU Graduate School requirements. The student and major adviser will prepare a plan of study by the end of the first year in residence. The Graduate School requires the plan of study for the Ph.D. degree to include no less than 90 semester graduate credits. Of these, no less than 27 credits must be in courses other than seminar or research credits, and must include 15 credits at the 700-789 level. An overall GPA of 3.0 or higher must be maintained. Please refer to the department website for more information on course requirements for this program.

Core courses must be completed before the student takes the oral or written preliminary examination, whereas elective classes can be completed any time prior to the defense of the written dissertation.

Examinations
Both a written and an oral, comprehensive, preliminary examination must be successfully completed to admit the student of candidacy for the Doctoral degree. These examinations should be taken no later than the end of the third year in residence. The written examination will consist of an approved, non-thesis research proposal written by the student in the format of a National Institutes of Health, National Science Foundation, or USDA postdoctoral fellowship proposal. Questions on the oral exam will be based upon the written proposal and upon graduate course work. After successful completion of the comprehensive written and oral preliminary examinations, the student will be formally admitted to candidacy for the Doctor of Philosophy degree.

Dissertation Research
In addition to the defense of the written dissertation in the final oral examination, the candidate will present a final public seminar based on the dissertation research. At least one academic semester, and preferably two semesters, shall elapse between the preliminary examinations and the oral defense of the research-based dissertation.

M.S. in Microbiology

A Master's degree in Microbiology at NDSU emphasizes research methodology and laboratory techniques. Student research and academic programs are individually tailored to meet the needs and interests of each student. Graduates are prepared for positions in research or commercial laboratories or for further graduate study. Students shall select a major adviser by the end of the first semester in residence. By the end of the first year in residence, the student and major adviser will select a supervisory committee. Students are encouraged to visit with each faculty member and spend time in each labora-

tory to acquaint themselves with the department's research programs.

Degree Requirements

The Master's program requires 24 months of full-time study, completing a minimum of 30 semester credits with an overall GPA of 3.0 or better. Students with inadequate undergraduate training in microbiology will be required to complete undergraduate courses in microbiology in addition to the required minimum 30 semester credits. The M.S. degree in microbiology requires a research-based thesis, a public seminar of the thesis research, and a final oral defense of the thesis. The supervisory committee administers the oral thesis examination.