

# Duluth Degree Programs and Faculty

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# Duluth Degree Programs and Faculty

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## General Information

At the University of Minnesota Duluth, The Graduate School awards the doctor of education (Ed.D.), its highest professional degree, in teaching and learning. The Ed.D. recognizes satisfactory academic preparation and demonstrated competence for professional activity in that field. Standards and procedures for admission, and expectations for scholastic performance, are comparable to those for the doctor of philosophy degree (Ph.D.) offered at the Twin Cities campus. Rules and procedures governing examinations, candidacy, time limits, appointment of committees, and the thesis for the Ph.D. apply in general to the Ed.D.

For specific information about requirements and procedures for the Ed.D. in teaching and learning at UMD, please see [www.d.umn.edu/grad/edd](http://www.d.umn.edu/grad/edd) or contact the Graduate School's UMD office, 431 Darland Administration Building, 1049 University Drive, Duluth, MN 55812 (218-726-7523; [grad@d.umn.edu](mailto:grad@d.umn.edu)).

The Graduate School also awards the master of fine arts in art (emphasis in graphic design); master of arts in communication sciences and disorders, criminology and English (emphases in literary studies, English studies, and publishing and print culture); master of science in applied and computational mathematics, chemistry, computer science, geological sciences, and physics; master of business administration; master of science electrical and computer engineering; master of science engineering management; master of liberal studies; master of music; and master of social work.

All-University master of science and doctor of philosophy programs in integrated biosciences, toxicology, and water resources science are offered jointly with the Twin Cities campus. See the All-University Programs section of this catalog for information about these programs. In addition, the biochemistry, molecular biology, and biophysics program at UMD is offered under the aegis of graduate programs on the Twin Cities campus.

All programs are under the jurisdiction of the Graduate School dean and have admission, candidacy, and degree requirements comparable to their counterpart programs on the Twin Cities campus. General Graduate School regulations, including those for minimum degree requirements, apply to programs offered on the Duluth campus (see General Information at the beginning of this catalog).

## Financial Aid

See General Information at the beginning of this catalog for information about assistantships, fellowships, and other financial assistance available to graduate students. Assistantships (teaching and research) are normally granted through the individual departments. Students can obtain information by writing to the director of graduate studies for their particular program. Graduate assistants on a 25 percent or greater appointment are entitled to health, medical, and dental insurance coverage at reduced premiums.

Some residence counseling positions may be available. For information, write to the Housing Office, 149 Lake Superior Hall, University of Minnesota Duluth, MN 55812.

Inquiries regarding loan funds, living accommodations, employment, and placement should be addressed to the vice chancellor for academic support and student life, 297 Darland Administration Building, University of Minnesota Duluth, MN 55812.

## Program Statements

Brief descriptions of the various degree programs are listed on the following pages. Course offerings are listed in the University of Minnesota Duluth Catalog and online at [www.catalogs.umn.edu/courses.html](http://www.catalogs.umn.edu/courses.html).

General information concerning graduate work on the Duluth campus may be obtained from the Graduate School Office—Duluth, University of Minnesota Duluth, 431 Darland Administration Building, 1049 University Drive, Duluth, MN 55812. Information is also available at [www.d.umn.edu/grad](http://www.d.umn.edu/grad).

## Key to Duluth Abbreviations

### Faculty

Graduate faculty are listed at the beginning of each degree program.

After the name, the home department, if different from the program name, will be listed, followed by the graduate faculty status in the program. Professors emeriti are identified by “(emeritus).”

### Membership Categories

**Senior Member (SM)**—Authorization to advise students at all levels, including the doctorate; to serve as a thesis reviewer and as an examiner on student examining committees, including service as chair of doctoral committees; to teach courses for graduate credit; and to participate in governance. In fields that also offer a professional doctorate, some senior member appointments may be restricted to the supervision of students seeking the professional degree.

**Affiliate Senior Member (ASM)**—Authorization to assume the same responsibilities as senior member, but not to participate in governance. In fields that also offer a professional doctorate, some affiliate senior member appointments may be restricted to the supervision of students seeking the professional degree.

**Member/Advising (M2)**—Authorization to advise students at the master’s level; to serve as a thesis reviewer at the master’s

level and as an examiner on student examining committees at the master’s and postbaccalaureate certificate levels; to teach courses for graduate credit; and to participate in governance. At the discretion of the appointing program, may also include authorization to co-advise doctoral students with a senior member or affiliate senior member of the graduate faculty, and to serve as a thesis reviewer and examining committee member for doctoral students, but not as chair.

**Affiliate Member/Advising (AM2)**—Authorization to assume the same responsibilities as member/advising, but not to participate in governance.

**Member (M)**—Authorization to serve as a thesis reviewer at the master’s level and as an examiner on student examining committees at the master’s and postbaccalaureate certificate levels; to teach courses for graduate credit; and to participate in governance. At the discretion of the appointing program, may also include authorization to serve as a thesis reviewer and examining committee member for doctoral students, but not as chair.

**Affiliate Member (AM)**—Authorization to assume the same responsibilities as member, but not to participate in governance.

**Examining Status (E)**—Authorization to serve as a thesis reviewer and as an examiner on student examining committees at all levels, but not as chair, and to teach courses for graduate credit. Examining status does not include membership on the graduate faculty and does not confer governance privileges.

### Tests

The following test abbreviations appear throughout graduate program listings.

**ECFMG**—Educational Commission Foreign Medical Graduates

**GMAT**—Graduate Management Admission Test

**GRE**—Graduate Record Examination

**IELTS**—International English Language Testing System

**MELAB**—Michigan English Language Assessment Battery

**SPEAK**—Speaking Proficiency English Assessment Kit

**TOEFL**—Test of English as a Foreign Language

**TSE**—Test of Spoken English

**USMLE**—United States Medical Licensing Examination

## Teaching and Learning

**Contact Information**—Department of Education, University of Minnesota Duluth, Montague Hall 120, 1211 Ordean Court, Duluth, MN 55812-3012 (218-726-6525; fax 218-726-7008; [kmehle@d.umn.edu](mailto:kmehle@d.umn.edu); [www.d.umn.edu/educ/programs/edd](http://www.d.umn.edu/educ/programs/edd))

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Randy E. Hyman, SM  
Linda Miller-Cleary, M2  
Bruce Munson, M2  
Tom Peacock, SM

### Associate Professor

Lynn M. Brice, M2  
Frank Guldbrandsen, SM  
Nedra Hazareesingh, M2  
Mary Hermes, SM  
Richard Kiefer-O'Donnell, M2  
Mary Ann Marchel, M2  
Molly H. Minkinen, M2

Helen Mongan-Rallis, M2  
Terrie M. Shannon, M2  
Jean M. Stevenson, M2  
Joyce Strand, SM  
Jiyoon Yoon, M2

### Assistant Professor

Sue Damme, M2  
Priscilla A. Fairbanks, M2  
Dan Glisczinski, M2  
Trudie Hughes, M2  
Joan Kwako, M2  
Chang'aa Mwetii, M2  
Gerry Nierengarten, M2  
Jacqueline Onchwari, M2  
Julia M. Williams, M2  
Mary F. Wright, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The doctor of education degree (Ed.D.) with a major in teaching and learning is an applied degree for the professional development of P-12, community college and university faculty and administrators, professionals in other human service professions such as coaching, athletic training, criminal justice, social work, extension, community agency administration, university student personnel, as well as business professionals involved in education and training activities. The mission of the program is to produce scholarly practitioners. The goals of doctoral study in this program are to help students 1) acquire greater content knowledge in teaching and learning; 2) develop abilities for research in the field of teaching and learning; 3) evolve a broadened professional background in areas related to teaching

and learning, such as systems and system interactions, and methods for program improvement; and 4) increase levels of cultural competence. Students will be immersed in research on best practices in teaching and learning, and will acquire the skills needed to apply best practices in their own schools and organizations.

**Prerequisites for Admission**—Special Application Requirements—Submission of GRE scores (preferred minimum score of 500 on verbal and quantitative portions) is required. Students whose native language is not English must submit their TOEFL scores. The application must also include three letters of recommendation, a minimum of three work samples (e.g., written reports, articles, presentations, curricula, or other professional artifacts), and a personal statement of career objectives. The statement of career objectives will be used to 1) evaluate how well this program will meet the needs of the applicant, 2) determine if appropriate concentration courses are available, and 3) conduct an initial evaluation of writing skills. GRE scores will be considered as part of a holistic evaluation of the application. Students will also be required to complete an assessment designed to determine an individual's fit with the hybrid online delivery model. Results of the survey will also be used as part of a holistic evaluation of the application.

### Ed.D. Degree Requirements

#### Required Core courses (37 cr)

- EDUC 8015—Research Design (3 cr)
- EDUC 8016—Theory and Practice in Qualitative Research Methods (3 cr)
- EDUC 8017—Theory and Practice in Quantitative Research Methods (3 cr)
- EDUC 8018—Statistical Analysis in Educational Research (3 cr)
- EDUC 8020—Doctoral Seminar (1 credit each of 4 terms)
- EDUC 8001—Historical and Philosophical Foundations of Education (3 cr)
- EDUC 8003—Educational Policy (3 cr)
- EDUC 8005—Curriculum Evaluation: Theory into Practice (3 cr)
- EDUC 8007—Research on Knowledge and Learning (3 cr)
- EDUC 7005—Teaching and Learning in a Systems Context (3 cr)
- EDUC 8009—Distance Education in 21st Century: From Theory to Practice (3 cr)
- EDUC 8021—Assessment (3 cr)

#### Related Field courses (minimum 15 credits)

EDUC 8888—Thesis (24 cr)

**Language Requirements**—None

**Preliminary Written and Oral Exam**—Preliminary written and oral examinations are required and will be administered

after completion of all research and major coursework.

**Project**—A project designed to build a knowledge base relevant to problems in schools and organizations

**Final Exam**—An oral defense of the project is required.

For specific information about requirements and procedures for the Ed.D. in teaching and learning at UMD, see [www.d.umn.edu/grad/jedd](http://www.d.umn.edu/grad/jedd) or contact the Graduate School's UMD office, 431 Darland Administration Building, 1049 University Drive, Duluth, MN 55812, (218-726-7523; [grad@d.umn.edu](mailto:grad@d.umn.edu)).

## Applied and Computational Mathematics

**Contact Information**—Department of Mathematics and Statistics, University of Minnesota Duluth, 140 Solon Campus Center, 1117 University Drive, Duluth, MN 55812 (218-726-8747; fax 218-726-8399; [math@d.umn.edu](mailto:math@d.umn.edu); [www.d.umn.edu/math](http://www.d.umn.edu/math)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Richard A. Davis, Chemical Engineering, M2  
Douglas J. Dunham, Computer Science, AM2  
Dalibor Froncek, M2  
Joseph A. Gallian, M2  
Richard F. Green, M2  
Barry R. James, M2  
Kang Ling James, M2  
Zhuangyi Liu, M2  
John Pastor, Biology, M2  
Ronald R. Regal, M2  
Harlan W. Stech, M2

### Associate Professor

Guihua Fei, M2  
John R. Greene, M2  
Carmen M. Latterell, M2  
Kathryn E. Lenz, M2  
Robert L. McFarland, M2  
Bruce B. L. Peckham, M2  
Yongcheng Qi, M2  
Steven A. Trogdon, M2

### Assistant Professor

Marshall E. Hampton, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—This program is for those wishing to pursue careers that use applied mathematics and statistics in science, industry, business, and teaching, and for those wishing to go on for doctoral degrees in mathematics or statistics. It emphasizes

the use of modern modeling techniques and computational methods with areas of concentration available in continuous modeling, probability/statistics, and discrete mathematics. The faculty is drawn largely from the Department of Mathematics and Statistics, but includes members from the Departments of Computer Science, Chemical Engineering, and Biology.

**Prerequisites for Admission**—Applicants should have completed an undergraduate degree in mathematics or statistics. However, a student with a degree in another major, and with a substantial background in mathematics or statistics (e.g., computer science or engineering), may also qualify. Students lacking certain prerequisites may make up deficiencies concurrently with graduate work.

**Special Application Requirements**—Applicants must submit scores from the General Test of the GRE, three letters of recommendation from individuals familiar with their scholarship and research potential; a complete set of official transcripts; and a clearly written statement of career interests, goals, and objectives. Students may apply at any time; however, submission of all applications materials by January 15 for fall semester is strongly encouraged to ensure priority consideration for university fellowships. The deadline for applying for assistantships awarded for the next academic year is March 1. Students can be admitted any term. Students whose native language is not English must submit their TOEFL or IELTS or MELAB scores.

### M.S. Degree Requirements

The master of science degree is offered under both Plan A (with thesis) and Plan B (without thesis). All students must complete at least 33 credits, of which at least 17 must be from approved mathematics or statistics courses or seminars (including a graduate seminar and three of the four core courses), and 6 must be from a minor or related field (statistics is a related field). Plan A also requires 10 thesis credits. Plan B requires a 2-credit project and an additional 8 credits from approved graduate-level mathematics, statistics, or related-field courses.

**Language Requirements**—None.

**Final Exam**—The final exams are written and oral.

### Minor Requirements for Students

**Majoring in Other Fields**—A minor for the master's degree requires 6 credits in approved MATH or STAT courses.

## Art—Graphic Design

**Contact Information**—Department of Art and Design, University of Minnesota Duluth, 317 Humanities Building, 1201 Ordean Court, Duluth, MN 55812 (218-726-8225; fax 218-726-6532; [art@d.umn.edu](mailto:art@d.umn.edu); [www.d.umn.edu/art/program/mfa.html](http://www.d.umn.edu/art/program/mfa.html)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Gloria Brush, M2  
James C. Klueg, M2

### Associate Professor

Alison J. Aune, M2  
Janice D. Kmetz, M2  
Sarah C. Nitschke, M2  
Robert A. Repinski, M2  
Robyn S. Roslak, Art History, M2  
Eun-Kyung Suh, M

### Assistant Professor

Steve Bardolph, M2  
David W. Bowen, M  
Jennifer L. Dietrich, AM2  
Jennifer A. Gordon, M  
Beth E. Koch, M2  
Victoria D. Lehman, M2  
Ryuta. Nakajima, M  
Wanda J. Pearcy, M  
Joellyn J. Rock, M  
Mariana M. Waisman, M2  
Jennifer Webb, M2

### Instructor

Rob Wittig, M

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of fine arts degree with an emphasis in graphic design may be earned full- or part-time. Within a liberal arts setting, the program is tailored to each individual's educational, artistic, and professional strengths. Expanding the boundaries of conventional design education, it includes the following areas of study: new media; motion graphics; communication design; interactive design; design in the public realm; experience design; graphic design history; and preparation for college teaching. Academic study and design studio practice are equally emphasized. The program draws on faculty with international and national experience as designers and artists who are recognized for the quality of their teaching, research and professional design activities.

**Prerequisites for Admission**—Applicants must have adequate undergraduate education and experience in the area of emphasis and a bachelor of arts, science,

or fine arts in graphic design. Individuals with undergraduate degrees in fine arts other disciplines who have completed a substantial number of design courses or who have extensive professional graphic design portfolios also may be considered for admission.

**Special Application Requirements**—A portfolio of 20 design works (Mac format CD or DVD), a letter of intent, a writing sample (written in or translated into English), and three letters of recommendation are also required as part of the application. Applicants must have a minimum undergraduate GPA of 3.00. The GRE is not required. For more information about the M.F.A., visit the program's Web site [www.d.umn.edu/art/program/mfa.html](http://www.d.umn.edu/art/program/mfa.html).

For more information about Graduate School admissions, see the Graduate School section of this catalog, or visit the Graduate School Web site.

### M.F.A. Degree Requirements

The M.F.A. is offered under Plan B and requires 60 credits. The time frame for completion of the coursework and research required for a master of fine arts degree with an emphasis in graphic design is usually three years (or five semesters) for full-time students. Because the department's financial aid does not extend beyond six semesters, all requirements for the master's degree must be completed and the degree awarded within seven years. For more complete information on degree requirements please see the *MFA Handbook* online at [www.d.umn.edu/art/program/download/pdf/Grad\\_hnbk\\_03\\_03\\_07.pdf](http://www.d.umn.edu/art/program/download/pdf/Grad_hnbk_03_03_07.pdf).

**Language Requirements**—None.

**Final Exam**—An oral exam based on the project and supporting paper is required.

## Biochemistry, Molecular Biology, and Biophysics

**Contact Information**—Department of Biochemistry and Molecular Biology, University of Minnesota, 251 School of Medicine, 1035 University Drive, Duluth, MN 55812 (218-726-7922).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

The UMD Department of Biochemistry and Molecular Biology faculty participate fully in the University's biochemistry, molecular biology, and biophysics graduate program ([www.med.umn.edu/duluth/about/BMB/Graduate\\_Program\\_Information](http://www.med.umn.edu/duluth/about/BMB/Graduate_Program_Information)).

Students are subject to the same entrance and degree requirements as all other University biochemistry graduate students. Up to two semesters of coursework on the Twin Cities campus may be required for doctoral students, depending on their needs and interests. Postdoctoral students are welcome and find favorable opportunities for continued research. Teaching and research assistantships are available to some students through the department as a form of financial aid. See the Twin Cities Campus Degree Programs and Faculty section of this catalog for more information about the program.

## Business Administration

**Contact Information**—M.B.A. Program, Labovitz School of Business and Economics, University of Minnesota Duluth, 111 LSBE Building, 1318 Kirby Drive, Duluth, MN 55812 (218-726-8986; fax 218-726-6789; [lsbe@d.umn.edu](mailto:lsbe@d.umn.edu); [www.d.umn.edu/goto/MBA](http://www.d.umn.edu/goto/MBA)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Praveen Aggarwal, Management Studies, M2  
Curt L. Anderson, Economics, AM  
Stephen B. Castleberry, Management Studies, M2  
Rodrigo J. Lievano, Finance and Management Information Sciences, M2  
Patricia A. Merrier, Finance and Management Information Sciences, M2  
Jon L. Pierce, Management Studies, M2  
Stephen A. Rubinfeld, Management Studies, M2  
Rajiv Vaidyanathan, Management Studies, M2  
Shee Q. Wong, Finance and Management Information Sciences, AM

### Associate Professor

Geoffrey G. Bell, Management Studies, M2  
Rodger L. Brannan, Accounting, AM  
Anne Cummings, Management Studies, M2  
Jannifer G. David, Management Studies, M2  
Manjeet Dhatt, Finance and Management Information Sciences, M2  
Sanjay Goel, Management Studies, M2  
Nik R. Hassan, Finance and Management Information Sciences, AM  
Kjell R. Knudsen, Management Studies, M2  
Seung C. Lee, Finance and Management Information Sciences, M2  
Dahui Li, Finance and Management Information Sciences, AM  
Jerry W. Lin, Accounting, M2  
A. Maureen O'Brien, Economics, M2  
Linda Rochford, Management Studies, M2  
Alan C. Roline, Accounting, M2  
Jennifer Schultz, Economics, M2  
Randall K. Skalberg, Accounting, AM

### Assistant Professor

Patricia S. Borchert, M2  
Saiying Deng, Finance and Management Information Sciences, M2  
David Doorn, Economics, M2

Christopher R. McIntosh, Economics, M2  
Jennifer Mencl, Management Studies, M2  
Bedassa Tadesse, Economics, M2  
Gregory P. Trudeau, Accounting, AM

### Instructor

John L. Kratz, Management Studies, AM

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of business administration program meets the needs of those who are currently employed full-time in professional managerial careers and would like to pursue a graduate management education primarily on a part-time basis. The program offers courses in both Duluth and Rochester. Most courses offered in Duluth meet one evening per week from 6 to 9 p.m. during the 15 weeks of the semester. Most courses offered in Rochester meet from 3 to 9:30 p.m. on Fridays and 8 a.m. to 12:30 p.m. on Saturdays every other week over a period of 7 weeks. It is possible to enroll in the program on a full-time basis by registering for 6 or more credits per semester.

### Prerequisites for Admission

Applicants must have a bachelor's degree from an accredited college or university with prerequisite courses in calculus, statistics, and made satisfactory progress in completing the required foundation/prerequisite coursework in financial accounting, economics, finance, production/operations, marketing, organizational management, and human resource management. The bachelor's degree may be in any field; however, students who have had little or no undergraduate or other education in business administration must complete foundation courses in the areas identified above. Students with exceptional academic records may apply for early admission prior to completion of this coursework (see [www.d.umn.edu/lisbe/mba/mba\\_earlyadmission.php](http://www.d.umn.edu/lisbe/mba/mba_earlyadmission.php) for details).

### Special Application Requirements

Applicants must have an acceptable score on the GMAT, passed the Certified Professional Accountant (CPA) examination, or completed a graduate degree from an accredited college or university. In addition, international students must have an acceptable score on the TOEFL.

## M.B.A. Degree Requirements

The M.B.A. requires 32 credits. All students must complete six core and three support area courses, which provide exposure to financial analysis and markets, domestic and global environments of business and organizations, the creation and distribution of goods and services, and human behavior in organizations. Also required are a capstone strategic management course and at least 2 credits of cross-functional experiences selected from special topics, workshops, projects, or field study. Students then choose one of two options for completing an additional 6 credits of elective coursework: coursework only or field research (Plan B). M.B.A. students may include selected 4xxx and/or 5xxx courses for electives in their degree programs subject to M.B.A. director approval.

**Language Requirements**—None.

**Final Exam**—For Plan B, students meet with their faculty committee for a final review of their completed project. For coursework only, no final exam is required.

## Chemistry

**Contact Information**—Department of Chemistry and Biochemistry, 246 Chemistry Building, 1039 University Drive, Duluth, MN 55812 (218-726-7212; fax 218-726-7394; [chem@d.umn.edu](mailto:chem@d.umn.edu); [www.d.umn.edu/chem/grad](http://www.d.umn.edu/chem/grad)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Ronald Caple, M2  
Robert M. Carlson, M2  
Lester R. Drewes, Biochemistry and Molecular Biology, M2  
John F. Evans, M2  
Vincent R. Magnuson, M2  
Donald P. Poe, M2  
Joseph R. Prohaska, Biochemistry and Molecular Biology, M2  
James P. Riehl, M2  
Bilin P. Tsai, M2  
Kendall B. Wallace, Biochemistry and Molecular Biology, M2  
Viktor Zhdankin, M2

### Associate Professor

Benjamin L. Clarke, Medical Microbiology and Immunology, M2  
Paul Kiprof, M2  
Keith B. Lodge, Chemical Engineering, M2  
Venkatram R. Mereddy, M2  
Elizabeth C. Minor, M2  
Viktor N. Nemykin, M2  
Paul D. Siders, M2  
Josef Werne, M2

## Assistant Professor

Grant W. Anderson, Pharmacy, M2  
Steven M. Berry, M2  
Robert T. Cormier, Biochemistry and Molecular Biology, M2  
Peter Grundt, M2  
Anne Hinderliter, M2  
Joseph L. Johnson, M2  
Jon N. Rumbley, M2

## Senior Research Associate

Subhash C. Basak, Natural Resources Research Institute, M2

## Research Fellow

Pavel A. Krasutsky, Natural Resources Research Institute, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of science program offers a broad-based education in chemistry that is well suited for students going on to doctoral programs, careers in industry, or professional schools. Both Plan A (with thesis) and Plan B (without thesis) are available. For Plan A, emphases include analytical, biological, inorganic, organic, and physical chemistry. The faculty includes members from the Departments of Chemistry and Chemical Engineering in the Swenson College of Science and Engineering; the Departments of Biochemistry and Molecular Biology and Medical Microbiology and Immunology in the Medical School; as well as members from the Natural Resources Research Institute, and the College of Pharmacy.

**Prerequisites for Admission**—Applicants must have completed an undergraduate chemistry or biochemistry major, including a junior-senior level course in inorganic chemistry, physical chemistry, mathematics through calculus, and one year of college physics, preferably taught using calculus. Students lacking some of these prerequisites may make up deficiencies concurrently with graduate work.

## M.S. Degree Requirements

All students must complete 31 credits, including a seminar and four core courses. All students must complete at least 14 credits in the major and at least 6 credits in a related field or minor. In addition, Plan A students must register for 10 thesis credits; Plan B students must complete an additional 10 course credits and write three papers. Attendance and presentation at the chemistry seminar are required. Individual programs

are designed to best serve the interests of the student. 4xxx courses must be approved by the director of graduate studies.

**Language Requirements**—None.

**Final Exam**—The final exam is oral.

### Minor Requirements for Students

**Majoring in Other Fields**—A master's minor requires at least 6 credits in chemistry courses. Individual programs must be approved by the director of graduate studies in chemistry.

## Communication Sciences and Disorders

**Contact Information**—Department of Communication Sciences and Disorders, University of Minnesota Duluth, 221 Bohannon Hall, 1207 Ordean Court, Duluth, MN 55812 (218-726-7974; fax 218-726-8693; [cd@d.umn.edu](mailto:cd@d.umn.edu); [www.d.umn.edu/csd/masters](http://www.d.umn.edu/csd/masters)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Paul N. Deputy, M2  
Mark I. Mizuko, M2

### Associate Professor

Kent R. Brorson, M2  
Faith C. Loven, M2  
Cynthia S. Spillers, M2

### Assistant Professor

Dana R. Collins, M2

### Instructor

Lynette R. Carlson, M2  
Jolene K. Hyppa Martin, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The graduate program in communication sciences and disorders effectively combines academic and clinical endeavors to prepare students to become speech-language pathologists. The program places a major emphasis on the development of clinical skills, although students have the opportunity to engage in a wide variety of academic and research activities as well. The curriculum, which is based on five semesters of study, is accredited by the American Speech-Language-Hearing Association's (ASHA) Council on Academic Accreditation (CAA).

### Prerequisites for Admission

Applicants must have a bachelor's degree in communication sciences and disorders.

### Special Application Requirements

Three letters of recommendation evaluating the applicant's scholarship and clinical potential are required. At least two letters should be from academic faculty familiar with the applicant. A personal statement of the applicant's short- and long-term goals is also required.

### M.A. Degree Requirements

The M.A. is offered only under Plan B. At least 43 credits are required, including 31 credits of required CSD courses, 2 credits of Plan B project (CSD 8099), 4 credits of internship, and at least 6 credits of approved courses (4xxx and higher) from related fields. All Plan B projects must be pre-approved by the student's examining committee, which also must give final approval.

**Language Requirements**—None.

**Final Exam**—The final exam is oral.

## Computer Science

**Contact Information**—Department of Computer Science, University of Minnesota Duluth, 320 Heller Hall, 1114 Kirby Drive, Duluth, MN 55812 (218-726-7678; fax 218-726-8240; [cs@d.umn.edu](mailto:cs@d.umn.edu); [www.d.umn.edu/cs/deggrad](http://www.d.umn.edu/cs/deggrad)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Carolyn C. Crouch, M2  
Donald B. Crouch, M2  
Douglas, J. Dunham, M2  
Richard F. Maclin, M2

### Associate Professor

Theodore D. Pedersen, M2  
Christopher G. Prince, M2  
Gary M. Shute, M2  
C. Hudson Turner, M2

### Assistant Professor

Peter J. Willemsen, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—Computer science is a discipline that involves understanding the design of computers and computational processes. Study in the field ranges from the theoretical study of algorithms to the design and implementation of software at the systems and applications levels.

The master of science is a two-year program that provides the necessary foundational studies for graduates planning to pursue

either a doctorate in computer science or a career as a computer scientist in business or industry.

**Prerequisites for Admission**—The program is designed for students with undergraduate degrees in computer science or computer engineering. These students should be able to enroll immediately in 8xxx computer science courses. Students with other backgrounds may be considered if they have completed the following courses or their equivalents: CS 1511–1521—Computer Science I–II; CS 2511—Software Analysis and Design; CS 2521—Computer Organization and Architecture; CS 3511—Computer Science Theory; CS 5621—Computer Architecture or CS 5651—Computer Networks; and CS 5631—Operating Systems. The appropriate math prerequisites, namely MATH 1296–1297—Calculus I–II and STAT 3611—Introduction to Probability and Statistics, are also required.

### Special Application Requirements

The GRE General Test is required of all applicants; the TOEFL is also required of international students.

### M.S. Degree Requirements

The master of science degree is offered under Plan A (thesis) and Plan B (non-thesis). At least 33 credits are required, including 16 credits from 8xxx courses in computer science, 1 credit of CS 8993—Seminar, and 6 credits from a specified set of courses outside of computer science (minor or related field). Plan A also requires 10 thesis credits; Plan B requires at least 10 credits in additional courses, 5xxx or above. Except in very rare instances these must be computer science courses. All courses are chosen in consultation with the student's adviser, subject to approval by the director of graduate studies. Normally 4xxx computer science courses may not be included in degree programs for the master of science in computer science.

**Language Requirements**—None.

**Final Exam**—Students present a departmental colloquium, followed by an oral exam.

### Minor Requirements for Students

**Majoring in Other Fields**—At least 6 credits in computer science are required for a master's minor.

## Criminology

**Contact Information**—Department of Sociology-Anthropology, University of Minnesota Duluth, 228 Cina Hall, 1123 University Drive, Duluth, MN 55812 (218-726-7801; fax 218-726-7759; [crimma@d.umn.edu](mailto:crimma@d.umn.edu); [www.d.umn.edu/socanth/criminology/macrim\\_graduateprogram.php](http://www.d.umn.edu/socanth/criminology/macrim_graduateprogram.php)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

John A. Arthur, M2  
William A. Fleischman, (emeritus), M2  
J. Clark Laundergan, (emeritus), M2  
Janelle L. Wilson, M2

### Associate Professor

Sheryl J. Grana, M2  
John E. Hamlin, M2  
Jeffrey R. Maahs, M2  
Robert R. Weidner, M2

### Assistant Professor

Emily Gaarder, M2  
Denise S. Hesselton, M2  
Daniel D. Martin, M2  
Melissa L. Walls, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The core courses for the Master of Arts (M.A.) in criminology feature relevant theoretical perspectives in understanding criminal behavior, methods of research and data analysis, and critical analysis of the criminal justice system. The curriculum is based on the premise that a liberal education in the social sciences includes the development of a student's ability to 1) define problems effectively by asking appropriate questions; 2) understand and respect people with diverse opinions, backgrounds, characteristics, and lifestyles; 3) respect the right of freedom of inquiry, willingly challenge conventional wisdom, and be intellectually flexible when challenged by factual information; and 4) understand the significance of inequality in the way that criminal justice is administered. The theme of inequality is incorporated into the graduate program as it is in the undergraduate program. In particular, structural forms of oppression are examined, and emphasis is placed on issues of social justice, human rights, and treatment/rehabilitation.

The framework of the program provides students with opportunities to develop a knowledge base that enhances understanding of criminal behavior and the workings of the criminal justice system. Core requirements give students experience in using various methods of research, analyzing and interpreting data, understanding and critiquing the main theoretical traditions in the field, and examining the organization of the criminal justice system. Furthermore, course electives enable students to focus on more specific interests (e.g., policing, courts, youth justice, etc.).

The M.A. in criminology provides an opportunity for both intellectual and professional development. The program serves those students with undergraduate degrees in criminology (or a related social science) who are interested in pursuing the advanced study of crime and justice. The program also serves those who have been employed in organizations and agencies and who wish to expand their knowledge and understanding in ways that may enhance their professional careers.

**Prerequisites for Admission**—Applicants must have a baccalaureate degree from an accredited U.S. institution or a foreign equivalent for admission to the master's program. Preference is given to applicants with undergraduate degrees in criminology, criminal justice, corrections, or sociology. Applicants with an undergraduate minor in criminology, criminal justice, corrections, sociology, law enforcement, or a major in a related field may also be considered. Undergraduate degrees in criminology, criminal justice, corrections, sociology, or a related field from foreign universities may also be considered, as long as those degrees are equivalent to a four-year American university baccalaureate degree. Admission to the program is competitive.

Applicants must have successfully completed an introduction to criminology or criminal justice course, the equivalent of one semester of research methods and/or statistics beyond the introductory level, and a course devoted primarily to social/behavioral theory. The minimum GPA for admissions is normally 3.00. Students with a GPA lower than 3.00 may occasionally be admitted where other credentials indicate a high likelihood of success in the program.

### Special Application Requirements

Applicants must supply three letters of recommendation evaluating the applicant's scholarship and potential for graduate study (at least two letters should be from academic faculty familiar with the applicant); an essay explaining why an advanced degree in criminology is of interest; why the applicant merits serious consideration; and a personal statement of the applicant's short and long-term professional goals and commitment to and preparation for graduate study in criminology. International students whose native language is not English also are required to submit scores from the TOEFL examination.

### M.A. Degree Requirements

The M.A. is offered under both Plan A and Plan B; each requires 38 credits. The Plan A option involves thesis work; the Plan B option involves a special project based upon a student's practicum work. The Plan B project combines theories, concepts, principles, and/or best practices from at least one course in the student's program of study with work being done in a practicum. All students must take CRIM 8100 (3 cr), CRIM 8200 (3 cr), CRIM 8201 (3 cr), CRIM 8140 (1 credit), and CRIM 8300 (3 cr). Plan A students must enroll in CRIM 8777—Masters Thesis Credits (minimum of 10 credits required). Plan B students must enroll in CRIM 8600—Criminology Practicum (minimum of 10 credits required). In addition to the credits listed above, all students must choose at least 9 additional credits in criminology courses, 5xxx or above.

Students are expected to include additional elective courses (6 cr) outside the major (in a minor or related field) as part of their program of study. The related field courses must be chosen in consultation with, and approved by, the student's advising/examining committee. Upon the advice and approval of the director of graduate studies, students may use 4xxx courses in related fields as appropriate. Sociology 4xxx courses may be included in either the Plan A or Plan B options for the M.A. in criminology.

**Language Requirements**—None.

**Final Exam**—Students present a department colloquium, followed by an oral examination.

### Minor Requirements for Students

**Majoring in other Fields**—A master's minor requires 4 credits in methods/statistics, 3 credits in theory, and 3 credits of electives.

## Electrical and Computer Engineering

**Contact Information**—Department of Electrical and Computer Engineering, University of Minnesota Duluth, 271 Marshall W. Alworth Hall, 1023 University Drive, Duluth, MN 55812 (218-726-6147; fax 218-726-7267; [ece@d.umn.edu](mailto:ece@d.umn.edu); [www.d.umn.edu/ece](http://www.d.umn.edu/ece)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Stanley G. Burns, M2  
Taek Mu Kwon, M2  
Marian Stachowicz, M2  
Jiann-Shiou Yang, M2

### Associate Professor

Christopher R. Carroll, M2  
Mohammed Hasan, M2  
M. Imran Hayee, M2

### Assistant Professor

Jing Bai, M2  
Hua Tang, M2  
Paul J. Weber, M2  
George L. Zimmerman, AM2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of science in electrical and computer engineering (M.S.E.C.E.) combines scholarship and research in a program oriented towards students and engineering practitioners in the private and public sectors who are interested in advanced coursework and applied research. The program requires 31 credits of graduate coursework and research, and focuses on core departmental strengths of design and implementation of computer hardware and software embedded controllers, computer networks, distributed computing, analog and digital VLSI circuit design and application, signal processing, communication systems, computational intelligence, robotics, and control systems.

### Prerequisites for Admission

Applicants should have completed an undergraduate degree in electrical, computer, electrical and computer engineering, or a related discipline, and must meet the general admission requirements of the Graduate School. A GPA of 3.00 to 4.00 from an accredited U.S. institution or foreign equivalent is preferred. Industrial experience and professional licensure may be considered. Previous graduate-level

coursework completed after receiving a baccalaureate degree may qualify for transfer credit upon recommendation and approval by the director of graduate studies.

**Special Application Requirements**—Two letters of recommendation concerning the student's readiness for graduate education and academic abilities are required.

### M.S.E.C.E. Degree Requirements

The M.S.E.C.E. degree provides both thesis (Plan A) and non-thesis (Plan B) options. The Plan B option is primarily for new engineering graduates and practicing engineers who want and need more technical education than would be provided by courses and an applied research-oriented project component. The Plan A option is primarily for those students wishing to prepare themselves for advanced doctoral studies and careers in research and academia.

Plan A students must complete a minimum of 31 semester credits in graduate courses. At least 15 credits must be electrical and computer engineering courses with at least 6 credits in courses numbered 4xxx or higher, 6 credits in courses numbered 5xxx or higher, and at least 3 credits in courses at 8xxx. At most, 8 credits in ECE 4xxx courses will be counted toward a degree. An additional 6 credits in graduate level courses must be in a related field or minor. The student must register for a minimum of 10 semester credits for the master's thesis. The director of graduate studies must approve all programs.

Plan B students must complete a minimum of 31 credits in graduate courses. At least 9 credits must be ECE courses numbered 5xxx and higher with at least 3 of those credits numbered 8xxx, excluding colloquium and Plan B project credits. Of the remaining credits, 12 must be in ECE courses numbered 4xxx or higher. At most, 8 ECE 4xxx credits will be counted. Of the remaining 10 credits, at least 6 of these must be outside of electrical and computer engineering. No more than 4 credits can be earned from projects. The director of graduate studies must approve all programs.

**Language Requirements**—None.

**Final Exam**—A formal defense of the thesis is required for Plan A students. The final exam for Plan B is a formal report and oral presentation.

### Minor Requirements for Students

**Majoring in Other Fields**—A master's minor requires 6 courses in electrical and computer engineering courses. Individual programs must be approved by the director of graduate studies in electrical and computer engineering.

## Engineering Management

**Contact Information**—Department of Mechanical and Industrial Engineering, University of Minnesota Duluth, 229 Voss-Kovach Hall, 1305 Ordean Court, Duluth, MN 55812 (218-726-8117; fax 218-726-8581; [msem@d.umn.edu](mailto:msem@d.umn.edu); [www.d.umn.edu/mie/MSEM](http://www.d.umn.edu/mie/MSEM)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Mark A. Fugelso, M2  
Abu Rashid Hasan, Chemical Engineering, M  
Ewil Kwon, Civil Engineering, M2  
Richard R. Lindeke, M2

### Associate Professor

Emmanuel Enemuoh, M2  
Daniel N. Pope, Mechanical Engineering, M2  
Ryan G. Rosandich, M2

### Assistant Professor

Seraphin C. Abou, M2  
Hongyi Chen, M2  
Robert G. Feyen, M2  
Todd W. Loushine, M2  
Xun Yu, M2

### Instructor

David J. Keranan, M

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of science in engineering management (M.S.E.M.) program provides engineers with tools to more effectively manage people, projects, technology, and information in their careers in order to promote economic growth, competitiveness, ethical decision-making, and environmental responsibility and sustainability. As people in engineering positions often manage technical projects of varying size and complexity, the M.S.E.M. provides an excellent foundation to perform these tasks. To meet the needs of practitioners, courses are offered in the evening and are available to remote sites by interactive television. Full-time enrollment is possible and the course structure allows for unique research opportunities.

**Prerequisites for Admission**—All applicants must meet the general admission requirements of the Graduate School. Applicants should have completed an undergraduate degree in an engineering discipline. However, an applicant with a degree in another technical major and a substantial background in engineering may qualify. Such students may be admitted on a case-by-case basis and are asked to submit documentation that substantiates their engineering experience and responsibilities. A minimum 3.00 GPA from an accredited U.S. institution or foreign equivalent is preferred.

**Special Application Requirements**—Applicants must provide two letters of recommendation concerning their academic ability and readiness for graduate education.

### M.S.E.M. Degree Requirements

Plan A students must complete at least 31 credits, including a minimum of 12 credits in the major core sequence, 6 credits from a related field, a minimum of 3 credits of electives, and 10 thesis credits. Individual programs are designed to best serve the interests of the student. The director of graduate studies must approve all programs. Plan B students must complete at least 30 credits, including the 12-credit major core sequence, a minimum of 3 additional credits in the major, a 3-credit capstone project course—Project Methodology and Practice, and 6 credits in a related field or minor. Students must complete an additional 6 credits in engineering management or other electives. The capstone project requires a formal report and oral presentation. Individual programs are designed to best serve the interest of the student. The director of graduate studies must approve all programs.

Students, upon the advice and approval of the director of graduate studies, may use 4xxx courses in related fields as appropriate for both Plan A and Plan B.

**Language Requirements**—None.

**Final Exam**—A formal defense of the thesis is required for Plan A students. The final exam is a formal report and oral presentation in EMGT 8310 for Plan B students.

**Minor Requirements for Students Majoring in Other Fields**—A master's minor requires 6 credits in engineering management courses. Individual programs must be approved by the director of graduate studies in engineering management.

## English

**Contact Information**—Department of English, University of Minnesota Duluth, 410 Humanities Building, 1201 Ordean Court, Duluth, MN 55812 (218-726-8228; fax 218-726-6882; [engl@d.umn.edu](mailto:engl@d.umn.edu); [www.d.umn.edu/engl/englishgrad/main/index.php](http://www.d.umn.edu/engl/englishgrad/main/index.php)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Thomas Bacig, Continuing Education, M2  
Martin F. Bock, M2  
Thomas J. Farrell, Writing Studies, M2  
Michael D. Linn, Writing Studies, M2  
Joseph C. Maiolo, M2  
Linda Miller-Cleary, M2

### Associate Professor

Katherine L. Basham, M2  
Carol A. Bock, M2  
Paul D. Cannan, M2  
Jill D. Jenson, Writing Studies, M2  
Kenneth C. Risdon, Writing Studies, M2  
Carolyn Sigler, M2  
Craig Stroupe, Writing Studies, M2  
Krista Sue-Lo Twu, M2

### Assistant Professor

David E. Beard, Writing Studies, M2  
Evan Brier, M2  
John Hatcher, Writing Studies, M2  
Hilary C. Kowino, M2  
Chongwon Park, Writing Studies, M2  
Juli J. Parrish, Writing Studies, M2  
John D. Schwetman, M2  
Rochelle R. Zuck, M2

### Instructor

Rob Wittig, Art and Design, AM

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of arts program offers courses in English, Irish, and American literature; creative writing; linguistics; composition and rhetorical theory; book history; publishing; and English education. The program has three master's emphases: a literary studies emphasis for concentrated study of literature, an interdisciplinary emphasis in English studies, and an emphasis in publishing and print culture.

**Prerequisites for Admission**—Entering students should have completed 30 credits in English (these may include credits in literature, language, and advanced composition), including 20 upper division English courses that offer broad coverage of English and American literature and at least one course in English language or

English linguistics. Any deficiencies will be determined by the director of graduate studies in consultation with the graduate committee. Certain course prerequisites may be taken concurrently with graduate work and may be applied toward degree requirements. For more information, see the program's Web site at [www.d.umn.edu/engl/englishgrad/main/index.php](http://www.d.umn.edu/engl/englishgrad/main/index.php).

**Special Application Requirements**—Students applying to this program must submit GRE General Test scores, two writing samples such as course papers, and three letters of recommendation.

### M.A. Degree Requirements

**Literary Studies Emphasis (Plan B)**—requires a minimum of 30 credits, including at least 24 credits in the major, 6 to 8 credits in a related field, and two Plan B projects.

**English Studies Emphasis (Plan B)**—requires a minimum of 31 credits, including at least 25 credits in the major, distributed in literature, linguistics, and composition/rhetoric; 6 to 8 credits in a related field; and two Plan B projects.

**Publishing and Print Culture Emphasis (Plan B)**—requires a minimum of 31 credits, including at least 25 credits within the major, distributed in literature, publishing, and print culture; 6 to 8 credits in a related field; and two Plan B projects. 4xxx courses in English, composition, and linguistics may not be included in degree programs in English but some 4xxx courses are permitted in the related field.

**Language Requirements**—The emphases in literary studies and publishing and print culture require certification of a reading knowledge of Latin, Greek, French, Italian, Spanish, Russian, or another approved language.

The English studies emphasis requires certification of a reading knowledge of a foreign language appropriate to the candidate's area of study and approved by the English graduate committee, or completion of at least 6 course credits beyond the 31 required credits. Candidates whose professional objectives are best served by completing the additional 6 credits select courses from literature and literary analysis, linguistics, composition/rhetoric, print culture, publishing, or courses closely related to their field of concentration.

**Final Exam**—Final exams are written and oral. Students must submit two Plan B projects totaling 120 hours of effort before taking the exam. The projects normally are completed in connection with courses in English or in a related field. A completed

project must be approved by a graduate faculty member.

**Minor Requirements for Students Majoring in Other Fields**—At least 8 credits in English, composition, and/or linguistics is required for a master's minor.

## Geological Sciences

**Contact Information**—Department of Geological Sciences, University of Minnesota Duluth, 229 Heller Hall, 1114 Kirby Drive, Duluth, MN 55812 (218-726-7239; fax 218-726-8275; [geol@d.umn.edu](mailto:geol@d.umn.edu); [www.d.umn.edu/geology/programs/grad.html](http://www.d.umn.edu/geology/programs/grad.html)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Erik T. Brown, M2  
Keith A. Brugger, Geology, Morris, AM2  
Steve Colman, M2  
John W. Goodge, M2  
Vicki L. Hansen, M2  
Timothy B. Holst, M2  
Thomas C. Johnson, M2  
Charles L. Matsch, (emeritus), AM2  
Howard D. Mooers, M2  
Ronald L. Morton, M2  
Richard W. Ojakangas, (emeritus), AM2

### Associate Professor

Christian D. Gallup, M2  
James D. Miller Jr., M2  
Penelope Morton, M2  
John B. Swenson, M2  
Nigel J. Wattrus, M2  
Josef P. Werne, Chemistry and Biochemistry, AM2

### Assistant Professor

Karen B. Gran, M2  
Jim Miller, M2

### Adjunct Assistant Professor

George J. Hudak III, Geology, University of Wisconsin-Oshkosh, AM2  
Dean M. Peterson, Natural Resources Research Institute, AM2  
Richard D. Ricketts, Large Lakes Observatory, AM2

### Research Associate

Tamara R. Diedrich, Natural Resources Research Institute, AM2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of science program in geological sciences includes areas of economic geology, geophysics, glacial geology and geomorphology, hydrogeology, igneous and metamorphic petrology, isotope and aqueous geochemistry, limnogeology, paleoclimatology, planetary geology, sedimentology and stratigraphy, surface processes, and structure-tectonics. Several of these areas are strengthened by collaboration with the Large Lakes Observatory and the Natural Resources Research Institute.

**Prerequisites for Admission**—Most candidates will have completed a bachelor's degree in geology, geophysics, or a related field. However, students with degrees in fields such as chemistry, physics, or biology are encouraged to apply. At least one year of study in calculus, chemistry, and physics is required. Field camp and/or undergraduate research experience is recommended.

**Special Application Requirements**—GRE General Test scores are required.

### M.S. Degree Requirements

The master of science degree is offered under Plan A (thesis) and Plan B (non-thesis). Courses are selected with approval of the student's adviser and the director of graduate studies. All courses must be at the 4xxx, 5xxx, or 8xxx level.

For Plan A, a candidacy exam that involves oral defense of written thesis research proposal during the second semester of residency is required. Plan A requires 31 credits, including 14 course credits in the major, 6 course credits in a minor or related field, a 1-credit course (GEOL 8200), and 10 thesis credits. For Plan B, a written candidacy exam during the second semester is required. Plan B requires 31 credits in approved courses, including three Plan B papers.

**Language Requirements**—None.

**Final Exam**—The final exam is oral.

**Minor Requirements for Students Majoring in Other Fields**—A master's minor requires at least 6 credits and is decided in consultation with the student's adviser and the director of graduate studies in geological sciences.

## Integrated Biosciences

See the **All-University Programs** section of this catalog for information about this program.

## Liberal Studies

**NOTE:** *No new students are currently being accepted to this program. Contact the Graduate School for information on the status of the program.*

**Contact Information**—College of Liberal Arts, M.L.S. Program, University of Minnesota Duluth, 104 Darland Administration Building, 1049 University Drive, Duluth, MN 55812 (218-726-8965; fax 218-726-6386; [nolsen@d.umn.edu](mailto:nolsen@d.umn.edu); [www.d.umn.edu/ce/html/mls.html](http://www.d.umn.edu/ce/html/mls.html)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Stephen Adams, English, M2  
John Arthur, Sociology-Anthropology, M2  
Elizabeth Bartlett, Women's Studies, M2  
William Fleischman, Sociology-Anthropology, M2  
Tom K. Isbell, Theatre, M2  
Lawrence Knopp, Geography, M2  
Michael W. Pfau, Communication, M2  
Richard A. Seybolt, Foreign Languages and Literatures, M2  
Judith Ann Trolander, History, M2

### Associate Professor

Mitra C. Emad, Sociology-Anthropology, M2  
Scott Freunds Schuh, Geography, M2  
Milan Kovacovic, Foreign Languages and Literatures, M2  
Robyn S. Roslak, Art, M2  
Rosemary Stanfield-Johnson, History, M2  
Maureen Tobin Stanley, Foreign Languages and Literatures, M2  
Robert R. Weidner, Sociology-Anthropology, M2  
Janelle L. Wilson, Sociology-Anthropology, M2  
Gesa Zinn, Foreign Languages and Literatures, M2

### Associate Professor

Scott M. Laderman, History, M2  
John D. Schwetman, English, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The interdisciplinary master of liberal studies (M.L.S.) is a community outreach program that provides citizens with the opportunity to return to higher education to broaden their intellectual horizons without having to focus on specific professional goals. To complete the M.L.S. degree, one to three papers or creative projects with an in-depth exploration of an interdisciplinary topic are required.

## M.L.S. Degree Requirements

The M.L.S. is offered only under Plan B. Students in either emphasis must complete 32 credits, including at least 4 credits of IS 8001—Introduction to Liberal Studies. One to three Plan B papers or creative projects are required in both emphases. Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

**Language Requirements**—None.

**Final Exam**—The final exam is oral.

## Linguistics (Minor Only)

**Contact Information**—Program in Linguistics, University of Minnesota Duluth, 435 Humanities Building, 1201 Ordean Court, Duluth, MN 55812 (218-726-8131; fax 218-726-6882; [mlinn@d.umn.edu](mailto:mlinn@d.umn.edu)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Michael D. Linn, Writing Studies, M

### Associate Professor

Jonathan B. Conant, (emeritus), Foreign Languages and Literatures, M

Milan Kovacovic, Foreign Languages and Literatures, M

Krista S. Twu, English, M

### Assistant Professor

Chongowon Park, Writing Studies, AM

**Curriculum**—Graduate students may elect linguistics—which is offered interdepartmentally and through the Program in Linguistics—as a related field, or, with approval of the director of graduate studies of the major, as a designated minor.

## Minor Requirements

The minor in linguistics requires a minimum of 6 credits selected from ANTH 4628—Language and Culture (3 cr), ENGL 5811—Introduction to Modern English (4 cr), ENGL 5821—History of the English Language (4 cr), LING 5195—Special Topics (3 cr), LING 5802—Applied Linguistics (4 cr), LING 5852—Practicum in Teaching Linguistics (3 cr), LING 8500—Graduate Seminar (3 cr), and LING 8591—Independent Study in Linguistics (1–3 cr).

## Music

**Contact Information**—Department of Music, University of Minnesota Duluth, 231 Humanities Building, 1201 Ordean Court, Duluth, MN 55812 (218-726-8207; fax 218-726-8210; [mu@d.umn.edu](mailto:mu@d.umn.edu); [www.d.umn.edu/music/degree/index.html](http://www.d.umn.edu/music/degree/index.html)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Ann C. Anderson, AM  
Judith Ann Kritzmire, M2  
Thomas J. Wegren, M  
Mark E. Whitlock, M2  
Stanley R. Wold, M2

### Associate Professor

Jeanne A. Doty, M2  
Ryan J. Frane, M  
Jean R. (Rudy) Perrault, AM  
Justin H. Rubin, M2  
Theodore A. Schoen, M

### Assistant Professor

Jefferson T. Campbell, M2  
Rachel L. Inselman, AM  
Tina L. Thielen-Gaffey, AM

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of music program offers students an opportunity to acquire advanced understandings and skills in music education theory and practice or in musical performance. Through a comprehensive curriculum, students in both emphases undertake core courses in musicianship, theory, history, research, and education/pedagogy. Additional courses in the area of specialization are specified relative to the interests and objectives of the student.

**Prerequisites for Admission**—Applicants must have an undergraduate degree in music. A GPA of 3.00 or higher is strongly preferred.

**Special Application Requirements**—In addition, the following must be submitted for review by the music graduate committee: 1) a completed Department of Music Graduate Study Application; 2) a sample of professional writing (a three- to five-page paper addressing current issues in music education or music performance); 3) two letters of reference from professional colleagues and/or supervisors describing the candidate's potential for success in the graduate music program; and 4) an entrance performance audition on the major instrument. Music education candidates may elect to substitute a DVD or videotape

of classroom teaching or conducting. Candidates seeking admission as a vocal performer must demonstrate foreign language proficiency or enroll in remedial courses.

## M.M. Degree Requirements

The M.M. Plan B in music education and performance emphases each requires 30 credits. The music education emphasis requires 14 credits in music education/education, 8 credits in the related field of music, 6 credits for the Plan B paper, and 2 elective credits.

The performance emphasis requires 14 credits in performance/pedagogy (includes recital credit), 8 credits in music theory and literature, 6 credits in research/foundations courses, 2 elective credits, and a solo recital. The recital fulfills the Plan B project requirement.

Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.

**Language Requirements**—None.

**Final Exam**—A comprehensive final examination is required. An oral examination must also be completed in music education (Plan B thesis) or performance (recital literature).

## Physics

**Contact Information**—Department of Physics, University of Minnesota Duluth, 371 Marshall W. Alworth Hall, 1023 University Drive, Duluth, MN 55812 (218-726-7124; fax 218-726-6942; [phys@d.umn.edu](mailto:phys@d.umn.edu); [www.d.umn.edu/~jmaps/gradpgm.html](http://www.d.umn.edu/~jmaps/gradpgm.html)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Bo Casserberg, (emeritus), AM2  
John R. Hiller, M2  
Thomas F. Jordan, (emeritus), AM2  
Michael Sydor, M2

### Associate Professor

Alec T. Habig, M2

### Assistant Professor

Jay A. Austin, M2  
Richard W. Gran, M2  
Sergei Katsev, M2  
Jonathan Maps, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of science program provides a grounding in the fundamentals of physics, combined with significant research involvement. The primary areas of research are computational physics, high-energy neutrino physics, experimental work in condensed-matter physics, and observational and theoretical work in physical limnology.

**Prerequisites for Admission**—An undergraduate degree in physics or the equivalent is required.

**Special Application Requirements**—Three letters of recommendation are required for assistantship support.

### M.S. Degree Requirements

The master of science degree is offered under both Plan A and Plan B. All students take 11 credits in a common core of courses (including PHYS 5501, 5511, 5521, and 2 credits in 5090), 3 credits in a methods course (PHYS 5052 or 5053 or 5061), and 6 credits in a minor or related field. Plan A also requires 10 thesis credits. Plan B requires one or more projects for a total of 120 hours of work, preparation of a written report for each project, and 10 additional course credits in physics. These courses may include 4xxx courses if appropriate and if approved for graduate credit; for distinctly interdisciplinary programs, the courses may be outside physics. In all cases, the overall plan of study and selection of elective courses must form a coherent program and be approved by the director of graduate studies.

**Language Requirements**—None.

**Final Exam**—The final exam is oral.

**Minor Requirements for Students**

**Majoring in Other Fields**—A master's minor requires 6 credits, of which no more than 1 credit can be from PHYS 5090.

## Social Work

**Contact Information**—Department of Social Work, University of Minnesota Duluth, 220 Bohannon Hall, 1207 Ordean Court, Duluth, MN 55812 (218-726-7245; fax 218-726-7185; [sw@d.umn.edu](mailto:sw@d.umn.edu); [www.d.umn.edu/sw](http://www.d.umn.edu/sw)).

For latest graduate faculty listings, see [www.grad.umn.edu/faculty\\_rosters/faculty.html](http://www.grad.umn.edu/faculty_rosters/faculty.html).

### Professor

Priscilla A. Day, M2  
Dennis R. Falk, M2  
Melanie F. Shepard, M2

### Associate Professor

Lynn Ellen H. Bye, M2  
R. Michael Raschick, M2

### Assistant Professor

Evie Campbell, M2  
Johanna M. Garrison, M2  
Janet M. Haynes, M2  
Ann Tellest, M2

### Instructor

Kathleen V. Heltzer, M2

Along with the program-specific requirements listed below, please read the General Information section of this catalog for Graduate School requirements that apply to all major fields.

**Curriculum**—The master of social work (M.S.W.) program offers a concentration in advanced generalist practice that prepares students to practice in a variety of human service settings. Graduates undertake a variety of professional social work roles ranging from counselor and case manager to community organizer and administrator. The curriculum has a special focus on services to American Indians and their communities. Coursework is also available in the area of child welfare practice. The M.S.W. program is accredited by the Council on Social Work Education.

### Prerequisites for Admission

Applicants should have a bachelor's degree from a regionally accredited college or university. This degree should include a solid background in the liberal arts, as evidenced on the transcript by courses in the arts, cultural studies, and behavioral and social sciences. Applicants should be knowledgeable about diverse cultures, social problems, social conditions, and the social, psychological, and biological determinants of human behavior. Applicants with undergraduate degree majors in social work or a related field or discipline are given preference over applicants with other majors.

### Special Application Requirements

Completion of at least 15 semester credits in two or more social science disciplines, such as sociology, psychology, economics, anthropology, or political science is required, as well as strong academic preparation as demonstrated by a preferred minimum undergraduate GPA of 3.00.

Applicants should show potential to contribute to the social work profession. Preference is given to applicants with professional experience in human service settings, particularly when this experience involves working with underrepresented and protected classes.

**Enrollment Prerequisites**—Admitted applicants must complete a college-level biology course with content on human anatomical and physiological development and a college-level statistics course. The biology course must be completed before registering for the first semester in the M.S.W. program, and the statistics course must be completed before registering for the first research course. Interested persons can apply and be admitted before completing the enrollment prerequisites.

**Advanced Standing**—Applicants with a bachelor of social work degree from a program accredited by the Council on Social Work Education may apply for admission to the advanced standing program. All other applicants are ineligible for this program.

## Degree Requirements

The M.S.W. requires 51 credits (34 credits for students admitted with advanced standing), including a minimum of 41 credits in social work courses (28 credits for advanced standing students), a master's project and final examination. The program requires two field placements in human service agencies (one field placement for students with advanced standing). A minimum GPA of 3.00 for courses included in the degree program is required. A level of personal and professional competence, as indicated by social work course and field placement evaluations, is required. Inclusion of 4xxx courses on degree programs forms is subject to adviser and director of graduate studies approval.

**Language Requirements**—None.

**Final Exam**—None.

## Toxicology

See the **All-University Programs** section of this catalog for information about this program.

## Water Resources Science

See the **All-University Programs** section of this catalog for information about this program.

## Related Fields

Graduate degree programs do not exist in the following fields. However, students may earn graduate credit in courses related to their program and use faculty members from these fields on their examining committees. For graduate courses, see the Courses section of the *University of Minnesota Duluth Catalog* or go online to [www.catalogs.umn.edu](http://www.catalogs.umn.edu).

## American Indian Studies

### Professor

John G. Red Horse, E

## Anthropology

### Professor

Linda S. Belote, E  
Michael D. Linn, Composition, E  
Ron T. Marchese, E  
Tim Roufs, E  
David M. Smith, E

### Associate Professor

Jennifer E. Jones, E

### Assistant Professor

David Syring, E

## Art History

### Associate Professor

Robyn Roslak, E

### Assistant Professor

Jennifer Webb, E

## Behavioral Sciences

### Professor

Mustafa N. al'Absi, E  
James G. Boulger, E  
Barbara A. Elliott, Family Medicine and  
Community Health, E  
Frederic W. Hafferty, E

### Associate Professor

Gary L. Davis, E  
Richard G. Hoffman, E  
Jane Hovland, E

## Chemical Engineering

### Professor

Richard A. Davis, E  
Abu R. Hasan, E

### Associate Professor

Keith B. Lodge, E  
Steven P. Sternberg, E

### Assistant Professor

Michael A. Rother, E  
Gregory Rutkowski, Pharmacy, E

## Communication

### Professor

Gerald L. Pepper, E  
Michael J. Sunnafrank, E

### Associate Professor

Virginia T. Katz, E  
Linda T. Krug, E  
Elizabeth J. Nelson, E  
Deborah S. Petersen-Perlman, E  
Michael W. Pfau, E

### Assistant Professor

Ryan C. Goei, E  
David C. Gore, E

## Cultural Studies

### Professor

Thomas D. Bacig, E  
Thomas J. Farrell, Composition, E  
Ron T. Marchese, E

### Associate Professor

Mitra C. Emad, E

## French

### Associate Professor

Yolande J. Jenny, Foreign Languages and  
Literatures, E  
Milan Kovacovic, Foreign Languages and  
Literatures, E

## Geography

### Professor

Lawrence M. Knopp Jr., E

### Associate Professor

Olaf Kuhlke  
Tongxin Zhu, E

### Assistant Professor

Gordon L. Levine, (emeritus), E  
Michael T. Mageau, E

### Instructor

Stacey L. Stark, E

## German

### Associate Professor

Gesa Zinn, Foreign Languages  
and Literatures, E

### Assistant Professor

Kristen Hylenski, Foreign Languages and  
Literatures, E

## Health Education

### Professor

Eugene S. Ley, E

### Associate Professor

Georgia L. Keeney, E  
Ladona L. Tornabene, E

## History

### Associate Professor

Alexis Pogorelskin, E

### Assistant Professor

Scott Laderman, E

## Industrial Engineering

### Associate Professor

Emmanuel U. Enemuoh, E  
Ryan G. Rosandich, E

## Journalism

### Instructor

Drew Digby, History, E  
Catherine E. Winter, Composition, E

## Mechanical Engineering

### Professor

Ryan G. Rosandich, E

### Associate Professor

Emmanuel U. Enemuoh, E  
Daniel Pope, E

## Philosophy

### Professor

Eve A. Browning, E  
James H. Fetzer, E  
David J. Mayo, E

### Associate Professor

David J. Cole, E

## Physical Education

### Associate Professor

Kenneth L. Gilbertson, E  
John R. Keener, E  
Morris Levy, E  
Duane G. Millslagle, E  
Mark E. Nierengarten, E

### Assistant Professor

Jane A. K. Carlson, E  
Donald T. Collins, E

## Political Science

### Professor

Elizabeth A. Bartlett, Women's Studies, E  
Paul Sharp, E

### Associate Professor

Mary Caprioli, E  
Craig H. Grau, E

### Assistant Professor

Mary Currin-Percival, E  
Runa Das, E  
Garrick L. Percival

### Adjunct Assistant Professor

Cindy M. Christian, Continuing Education, E

## Psychology

### Associate Professor

Robert Lloyd, E

### Assistant Professor

Kathy Dowell, E  
Rick A. LaCaille, E  
Lara LaCaille, E  
Karen L. Marsh, E

## Recreation

### Associate Professor

Kenneth L. Gilbertson, E

### Instructor

Thomas H. Beery, E

## Sociology

### Professor

John A. Arthur, E  
William A. Fleischman, E  
Janelle L. Wilson, E

### Adjunct Professor

Clark Laundergan, E

### Associate Professor

Sheryl J. Grana, E  
John E. Hamlin, E  
Jeffrey R. Maahs, E  
Robert R. Weidner, E

### Assistant Professor

Deborah M. Plechner, E

### Instructor

Bruce Mork, E

## Spanish

### Professor

Richard A. Seybolt, Foreign Languages and  
Literatures, E  
Eileen M. Zeitz, Foreign Languages and  
Literatures, E

## Special Education

### Associate Professor

Joyce Strand, Education, E

### Assistant Professor

Trudie A. Hughes, Education, E  
Gerry Nierengarten, Education, E

## Theatre

### Professor

Ann A. Bergeron, E  
Tom K. Isbell, E  
Kate Ufema, E  
Arden W. Weaver, E

### Associate Professor

Jon M. Berry, E  
Patricia Dennis, E  
Mark A. Harvey, E  
William E. Payne, E

## Women's Studies

### Professor

Elizabeth A. Bartlett, E

### Associate Professor

Margaret N. Kamau, E  
Tineke Ritmeester, E

