Duluth Campus

Advocacy and Political Leadership M.A.P.L.
College of Liberal Arts - Adm
College of Liberal Arts

Link to a list of faculty for this program.

Contact Information:
112 Cina Hall, 1123 University Drive, Duluth, MN 55812 (218-726-6711; fax: 218-726-6780)
Email: maplapps@d.umn.edu
Website: http://www.umdmapl.org

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 32
- This program does not require summer semesters for timely completion.
- Degree: Master of Advocacy and Political Leadership

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

This applied degree is designed for residents of Minnesota and western Wisconsin with experience or interest in having an impact on and changing public policy. Graduates of this program generally go on to positions as local community leaders, labor leaders, government relations specialists in businesses, nonprofit sector policy advocates, inter-governmental relations specialists, political operatives, lobbyists, elected and appointed officials, staff to policy makers, and citizens. The program seeks to create a professional group of ethically grounded advocates and organizers. Students come from throughout the region with many already working in one of the above interest areas.

Cohorts of up to 15 students will form at the beginning of each semester and progress together through the four semesters required to complete the program. The program is 32 credits composed of 12 cohort course credits, 15 elective course credits, and 5 advocacy internship course credits. Classes meet 11 weekends each semester, and are scheduled in 3-hour time periods on Friday evening, Saturday morning, and Saturday afternoon. Students may choose to concentrate in one of three fields: community leadership (advocacy in the public sector), nonprofit advocacy, or labor organizing and leadership.

Program Delivery
This program is available:
* via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Admission to the master of advocacy and political leadership program is based on the following criteria:
- Applicant must hold a bachelor's degree with transcripts demonstrating the ability to handle graduate-level work.
- Prospective students must complete the program application.
- Two letters of recommendation and a short statement of interest must be submitted along with the application.
- Applicant must demonstrate experience in public service, which includes activities such as volunteering with nonprofits, involvement in student government, or activity in political/civic life.
- There is no entrance exam required for admittance to the program.

Applications are accepted on a rolling basis. New cohorts are admitted each semester.

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
Plan C: Plan C requires 14 major credits and null credits outside the major. The is no final exam.

This program may not be completed with a minor.
Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.75 is required for students to remain in good standing.

Elective course credits - 15 credits, to be selected from the following:
MAPL 5110 - Ethics in Politics (3 cr)
MAPL 5111 - Labor Organizing (3 cr)
MAPL 5113 - Labor and Political Economy (3 cr)
MAPL 5200 - Advocacy and Lobbying: Strategies and Tactics (3 cr)
MAPL 5202 - Nonprofits and Government (3 cr)
MAPL 5301 - Campaigns and Elections (3 cr)
MAPL 5311 - Advocacy in the Public Sector: Service in the Elected Branch (3 cr)
MAPL 5312 - Advocacy in the Public Sector: Service in the Executive Branch (3 cr)
MAPL 5308 - Impact of Art and Social Change (3 cr)
MAPL 5309 - Legal System and Public Policy (3 cr)
MAPL 5315 - Sustainable Development Policy and Advocacy (3 cr)
MAPL 5400 - Political Organizing and Advocacy in the Digital Age (3 cr)
MAPL 5405 - Impact of Group Identity on the Policymaking Process (3 cr)

Advocacy Internship course credits: 5 credits
MAPL 6009 - Advocacy Internship I (2 cr)
MAPL 6008 - Advocacy Internship II (3 cr)

If they wish, students can complete nine electives in one of three fields of concentration: labor organizing and leadership, nonprofit advocacy, or community leadership (public sector), as described below. Concentration classes are open to all students and count toward the general elective requirements. It is not necessary for students to declare a concentration.

**Required Coursework**
- MAPL 6001 - Political Process and Public Policy (3.0 cr)
- MAPL 6005 - Political and Advocacy Leadership (3.0 cr)
- MAPL 6004 - Political Organizing and Communication (3.0 cr)
- MAPL 6002 - Policy Evaluation (3.0 cr)

**Program Sub-plans**

A sub-plan is not required for this program. Students may not complete the program with more than one sub-plan.

**Labor Organizing and Leadership**

Students concentrating in labor organizing and leadership will learn to:
- value and promote the dignity of work and the dignity of all workers;
- understand the strategies and tactics of collective action and organizing and movement building;
- understand the role of labor in the political economy;
- understand the fundamental human and legal rights of workers and the challenges they face in the US and around the world;
- know what labor unions are and what they do in the workplace, in local communities, in the political arena and internationally;
- be acquainted with the defining events and major themes of U.S. and Minnesota Labor History;
- identify Information sources for research on unions and labor issues.

**Required Coursework**
- MAPL 5111 - Labor Organizing (3.0 cr)
- MAPL 5113 - Labor and Political Economy (3.0 cr)
- MAPL 5405 - The Impact of Group Identity on the Policymaking Process (3.0 cr)

**Non-Profit Advocacy**

Students concentrating in nonprofit advocacy will learn to:
- understand the role and potential of the nonprofit sector in advancing public policies that strengthen communities and build a more just society;
- build their knowledge and skills in advocacy and organizing for change;
- lead their organizations and allies in collective action to advance social change movements;
- strengthen the nonprofit sector's role in engaging people in democracy supporting activities, including legislative and electoral processes;
- leverage nonprofits' ongoing and trusted relationships with people in the communities they serve to increase grassroots activism;
- know the nonprofit sector's history, characteristics, standards of practice, defining events, key issues, and accomplishments;
- secure and use resources available to support nonprofit research and advocacy.

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Information current as of October 02, 2012
Required Coursework
MAPL 5200 - Advocacy and Lobbying: Strategies and Tactics (3.0 cr)
MAPL 5202 - Nonprofits and Government: The Public and Private Partnership (3.0 cr)
MAPL 5306 - The Impact of Art on Social Change (Additional option under this concentration.)

Public Sector
Students concentrating in community leadership (public sector) will learn to:
- understand the duties and responsibilities of people serving as either staff or elected officials in the elected or administrative branches of government;
- become familiar with the organization and practices of the Minnesota Legislature, the U.S. Congress, and federal and state administrative offices;
- assess the structure of legislative and administrative public organizations in terms of their ability to make policy changes;
- analyze and plan both the passage and implementation of policy in which they are interested;
- appreciate the high ethical standards which must and usually do govern service in the public sector;
- gain an appreciation for the importance of constituent service and engagement while working in the public sector;
- understand both the theoretical and practical underpinnings of American legislative and administrative practice.

Required Coursework
MAPL 5113 - Labor and Political Economy (3.0 cr)
MAPL 5112 - Advocacy in the Public Sector: Service in the Elected Branch
MAPL 5110 - Ethics in Politics (Additional option under this concentration)
MAPL 5301 - Campaigns and Elections (Additional option under this concentration.)
MAPL 5315 - Sustainable Development Policy and Advocacy (Additional option under this concentration.)
**Duluth Campus**

**Applied and Computational Mathematics M.S.**  
*Swenson College of Science and Engineering*

Link to a list of faculty for this program.

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

- Program Type: Master's  
- Requirements for this program are current for Fall 2011  
- Length of program in credits: 35  
- This program does not require summer semesters for timely completion.  
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](http://www.d.umn.edu/math/index) section of the catalog website for requirements that apply to all major fields.

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 also includes members from the Departments of Computer Science, Chemical Engineering, and Biology.

**Program Delivery**  
This program is available:  
- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**  
The preferred undergraduate GPA for admittance to the program is 3.00.

An undergraduate degree in mathematics or statistics is preferred. Students with degrees in any major and with a substantial background in mathematics or statistics are also encouraged to apply.

Other requirements include the following:  
- Scores from the General Test of the Graduate Record Examination, which must be mailed to the Department of Mathematics and Statistics directly  
- Letters of recommendation from three people who are familiar with the applicant's educational/professional background (Request forms for these letters are part of the online application.)  
- Statement on career objectives and motivation (also a part of the online application)

Students applying for financial aid should have all application materials submitted by February 15; late applications will be considered if resources are available. Applicants seeking to enroll during the fall semester must submit all materials by July 15. For initial enrollment in the spring semester, the deadline is November 1. Students can be admitted any term. Students whose native language is not English must submit TOEFL scores.

Applicants must submit their test score(s) from the following:  
- GRE

International applicants must submit score(s) from one of the following tests:  
- TOEFL  
  - Internet Based - Total Score: 79  
  - Internet Based - Writing Score: 21  
  - Internet Based - Reading Score: 19  
  - Paper Based - Total Score: 550  
- IELTS  
  - Total Score: 6.5
• MELAB
  - Final score: 80

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 14 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project:** The Plan B project must be presented to the department in a seminar or colloquium, and prepared for publication as a departmental technical report. A PDF file of the final version must be submitted to the department.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

The master of science degree is offered under both Plan A (with thesis) and Plan B (without thesis). All students must complete at least 35 credits, of which at least 14 must be from approved mathematics or statistics courses or seminars (including a graduate seminar and three of the four core courses; MATH 8777 and MATH 8994 are excluded from these 14 mathematics credits), and 6 must be from a minor or related field (statistics is a related field). Plan A also requires 10 thesis credits. Plan B students must register for 2 credits of MATH 8994 - Directed Research every semester until they defend their project; and for an additional 8 credits from approved graduate-level mathematics, statistics, or related-field courses.
Duluth Campus

Applied and Computational Mathematics Minor

Mathematics & Statistics
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Department of Mathematics and Statistics, 140 Solon Campus Center, 1117 University Drive, Duluth, MN 55812 (218-726-8747; fax: 218-726-8399)
Email: math.dgs@d.umn.edu
Website: http://www.d.umn.edu/math/index

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 6
- This program does not require summer semesters for timely completion.

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

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 also includes members from the Departments of Computer Science, Chemical Engineering, and Biology.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minor for the master's degree requires 6 credits in approved MATH or STAT courses.
Duluth Campus

Art M.F.A.
UMD Art and Design, Dept of
School of Fine Arts

Link to a list of faculty for this program.

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)
Email: art@d.umn.edu
Website: http://www.d.umn.edu/art/grad

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 60
- This program does not require summer semesters for timely completion.
- Degree: Master of Fine Arts

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

The master of fine arts with an emphasis in graphic design may be earned full- or part-time. All requirements for the master's degree must be completed and the degree awarded within seven years. Full-time students usually finish the program in five semesters. The department's financial aid does not extend beyond six semesters.

Within a liberal arts setting, our 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; book arts; design in the public realm; experience design; graphic design history, theory, criticism; and preparation for college teaching. Academic study and 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.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

An undergraduate degree in graphic design or art is preferred. Students with degrees in any major and with a substantial background in graphic design are also encouraged to apply.

The M.F.A. is offered under Plan B and requires 60 credits.

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 website, www.d.umn.edu/art/grad.

For more information about graduate admissions, visit the Graduate School website.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80
Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

**Program Requirements**

**Plan B**: Plan B requires 54 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project**: The successful completion of this program requires the ability to express one's thoughts and work in written, as well as visual form. Early classes will consist of custom assignments and directed work tailored toward the student's area of interest. This is also the time for discussion of the final project. Directed readings will supplement group readings and discussions for enhancement of understanding of the student's area of interest/project. Later classes will combine directed and self-generated work and reading. Students will be responsible for compiling and securing faculty approval of a reading list, writing plan, timeline for completion of project goals; and for securing faculty approval of plans for their final project (carried out in Art 8990 - MFA Creative Thesis).

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

**Program Sub-plans**

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

**Graphic Design**
Duluth Campus

Art Minor
UMD Art and Design, Dept of
School of Fine Arts

Link to a list of faculty for this program.

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)
Email: art@d.umn.edu
Website: http://www.d.umn.edu/art/grad

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

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

A graduate minor in art is available, with an emphasis in graphic design.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.
Duluth Campus

Autism Spectrum Disorders Postbaccalaureate Certificate

Continuing Education

Contact Information:
Continuing Education, University of Minnesota Duluth, 403 Darland Administration Building, 1049 University Drive, Duluth, MN 55812
(218-726-8113; 800-627-3529; fax: 218-726-7888)
Email: cehelp@d.umn.edu
Website: http://www.d.umn.edu/ce

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2011
- Length of program in credits: 12
- This program requires summer semesters for timely completion.
- Degree: Autism Spectrum Disorder Certificate

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

This certificate program is intended for students who are interested in training in autism spectrum disorders (ASD). The program is designed for special education teachers, prospective teachers, paraprofessionals, and other related professionals who work with children and youth with autism spectrum disorders.

The three-course, online series offers the opportunity for students to expand their knowledge and expertise in the area of ASD. Participants in the 12-credit certificate will learn research-based best practices in the field of ASD, consistent with Minnesota Department of Education competencies. The certificate is designed to be completed in one year.

Program Delivery
This program is available:
• completely online (all program coursework can be completed online)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 2.50.

Applicants must have completed a bachelor's degree and have a preferred undergraduate GPA of at least 2.50 or a graduate GPA of at least 2.70.

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.50 is required for students to remain in good standing.

Required Coursework
- SPED 4250 - Foundations of Autism Spectrum Disorders (4.0 cr)
- SPED 5250 - Foundations of Autism Spectrum Disorders (4.0 cr)
- SPED 4270 - Methods for Teaching Children and Youth with Autism Spectrum Disorders (4.0 cr)
- SPED 5270 - Methods for Teaching Children and Youth with Autism Spectrum Disorders (4.0 cr)
- SPED 4260 - Language and Social Skills for Children and Youth with Autism Spectrum Disorders (4.0 cr)
- SPED 5260 - Language and Social Skills for Children and Youth with Autism Spectrum Disorders (4.0 cr)
Duluth Campus

Business Administration M.B.A.
Labovitz School of Business & Economics - Adm
Labovitz School of Business and Economics

Link to a list of faculty for this program.

Contact Information:
Labovitz School of Business and Economics, 219 LSBE, 1318 Kirby Drive, Duluth, MN 55812 (218-726-8986; fax: 218-726-6936)
Email: lsbe@d.umn.edu
Website: http://www.d.umn.edu/goto/mba

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 32 to 38
- This program requires summer semesters for timely completion.
- Degree: Master of Business Administration

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

The master of business administration program meets the needs of those who are currently employed full-time in professional managerial careers and who 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.

Accreditation
This program is accredited by the Association to Advance Collegiate Schools of Business International (AACSB).

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Foundation courses in business, quantitative methods and statistics.

Applicants must submit their test score(s) from the following:
- GRE
- GMAT
  - Total score: 540

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (GRE, GMAT, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.
Program Requirements

Plan B: Plan B requires 32 major credits and 6 credits outside the major. The final exam is oral.

Plan C: Plan C requires 32 major credits and null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

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.

Program Sub-plans

A sub-plan is not required for this program. Students may not complete the program with more than one sub-plan.

Rochester
Duluth Campus

Business Administration Minor
Labovitz School of Business & Economics - Adm
Labovitz School of Business and Economics

Link to a list of faculty for this program.

Contact Information:
Labovitz School of Business and Economics, 219 LSBE, 1318 Kirby Drive, Duluth, MN 55812 (218-726-8986; fax: 218-726-6936)
Email: lsbe@d.umn.edu
Website: http://www.d.umn.edu/goto/mba

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.
- Classes are also offered on the Rochester campus.

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

The minor in business administration allows current graduate students to pursue management education as part of their curriculum. 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.

Accreditation
This program is accredited by the Association to Advance Collegiate Schools of Business International (AACSB).

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.

A master's minor in business administration requires 6 credits.
Duluth Campus
Chemistry M.S.
Chemistry and Biochemistry
Swenson College of Science and Engineering

Link to a list of faculty for this program.

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

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 31
- This program requires summer semesters for timely completion.
- Degree: Master of Science

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

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.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have completed an undergraduate chemistry or biochemistry major. Coursework should include inorganic chemistry, physical chemistry, calculus, and physics.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
Plan A: Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 24 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: The Plan B requires writing three papers.
This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

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.
Duluth Campus
Chemistry Minor
Chemistry and Biochemistry
Swenson College of Science and Engineering

Link to a list of faculty for this program.

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

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 6
- This program does not require summer semesters for timely completion.

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

The graduate chemistry 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. 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.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.
Duluth Campus

Civil Engineering M.S.
UMD-Civil Engineering, Dept of
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
221 Swenson Civil Engineering, 1405 University Drive, Duluth, Minnesota, MN 55812 (218-726-6444; fax: 218-726-6445)
Email: jbergma1@d.umn.edu
Website: http://www.d.umn.edu/civileng/grad/index.html

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

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

The Civil Engineering Department offers graduate degrees in civil engineering. The master of science (M.S.) in civil engineering is intended for students pursuing a research emphasis and seeking in-depth knowledge in an area within civil engineering. Undergraduate students who are planning to go to graduate school may apply for the Master of Science in Civil Engineering Integrated Undergraduate (MS IUG) Program for double count.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have earned a B.S. degree in engineering (e.g., civil, mechanical, chemical, environmental) or the sciences (e.g., chemistry, physics, mathematics).

For students from disciplines other than civil engineering, some remedial coursework may be needed. Students requiring a substantial amount of remedial coursework (e.g., more than 3 courses) may be recommended to complete a few courses prior to entry into the program, but for most students the additional coursework could be completed while a graduate student in the program. Students should consult with the CE director of graduate studies or a faculty member in their area of interest for a review and assessment of their academic background and coursework needs.

Special Application Requirements:
Applicants should submit the following supplemental materials with their application:
- Applicant Statement Number 1 (Educational and Career Goals, limit one page)
- Applicant Statement Number 2 (Statement of Purpose, limit one page)
- Program form for Civil Engineering
- CV or resume (list technical publications and conference presentations)
- Unofficial transcripts
- Two letters of recommendation (waived for current UMD CE undergraduate students)
  - Letters should be requested from persons familiar with the student's performance in an academic or non-academic (i.e. work) setting and who can comment on potential for success in graduate school. Preference is for recommenders from academia.
  - Recommenders should address the following points: (i) the capacity in which they know the student—as a teacher, research adviser, work supervisor, etc., and for how long; (ii) academic (or work) record and accomplishments; and (iii) their assessment of the student's ability to succeed in graduate-level coursework and research.
  - Letters of recommendation should be submitted online through the existing application. When recommenders use the online process, there is an optional student rating form. It is important that each recommender submit a narrative letter, regardless of whether or not they use the optional rating form.
  - While online recommendations are preferred, paper copies are acceptable. Paper copies should be directly mailed to the department in sealed envelopes.
Applications are due December 15 for consideration for the following fall semester and March 31 for consideration for the following spring semester. Domestic applicants applying for a part-time study who do not require financial support are able to apply as late as March 15 for fall and September 12 for spring semester respectively, but are still encouraged to apply by the above mentioned CE deadlines.

Applicants must submit their test score(s) from the following:
- GRE

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

**Plan A**: Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B**: Plan B requires 21 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

**Capstone Project**: Courses and a project are arranged by the student and department adviser.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

The M.S. Plan A is intended for students pursuing a research emphasis and seeking in-depth knowledge in an area within civil engineering. The M.S. requires completion of an original body of work resulting from research conducted by the student under the supervision of an advisory committee of graduate faculty members. The M.S. requires 20 credits of coursework and 10 thesis credits (approximately 375 hours of work including writing of the report), usually completed within two years.

The M.S. Plan B is designed to provide additional training in civil engineering to prepare students for a higher level of engineering design work. The M.S. Plan B requires 24 credits of coursework and 6 credits for a project (approximately 225 hours of work, including writing of the report), usually completed within one to two years.
Duluth Campus
Communication Sciences and Disorders M.A.
Communication Sciences & Disorders
College of Education and Human Service Professions

Link to a list of faculty for this program.

Contact Information:
Department of Communication Sciences and Disorders, 174 Chester Park, 31 W. College Street, Duluth, MN, 55812 (218-726-7974; fax: 218-726-8693)
Email: cd@d.umn.edu
Website: http://www.d.umn.edu/csd

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 43
- This program requires summer semesters for timely completion.
- Degree: Master of Arts

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

The graduate program in communication sciences and disorders (CSD) 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 Council of Academic Accreditation (CAA) in speech-language pathology and also by the American Speech-Language Hearing Association (ASHA).

Accreditation
This program is accredited by the Council on Academic Accreditation of the American Speech Language Hearing Association.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have the equivalent of a four-year American university baccalaureate degree in communication disorders with a cumulative undergraduate GPA of 3.00 or higher.

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

Special Application Requirements:
Applicants must provide at least three letters of recommendation, a personal statement, and a checklist of academic and clinical undergraduate experiences.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).

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For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

**Program Requirements**

**Plan B:** Plan B requires 37 major credits and 6 credits outside the major. The final exam is oral.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

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 work (CSD 8099), 4 credits of internship experience, and at least 6 credits of approved courses (4xxx and above) from related fields. All Plan B projects must be pre-approved by the student's examining committee, which also must give final approval.
**Duluth Campus**

**Communication Sciences and Disorders Minor**

*Communication Sciences & Disorders*

*College of Education and Human Service Professions*

Link to a [list of faculty](#) for this program.

**Contact Information:**
Department of Communication Sciences and Disorders, 174 Chester Park, 31 W. College Street, Duluth, MN, 55812 (218-726-7974; fax: 218-726-8693)
Email: cd@d.umn.edu
Website: [http://www.d.umn.edu/csd](http://www.d.umn.edu/csd)

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate minor in communication sciences and disorders introduces students to the field of speech-language pathology.

**Accreditation**
This program is accredited by the Council on Academic Accreditation of the American Speech Language Hearing Association.

**Program Delivery**
This program is available:
- via classroom (the majority of instruction is face-to-face)

**Program Requirements**
Use of 4xxx courses towards program requirements is not permitted.

A master's minor requires 6 credits of courses in communication sciences and disorders.
**Duluth Campus**
**Computer Science M.S.**
**Computer Science**
Swenson College of Science and Engineering

Link to a [list of faculty](#) for this program.

**Contact Information:**
Department of Computer Science, University of Minnesota Duluth, 1114 Kirby Drive, 320 Heller Hall, Duluth, MN 55812 (218-726-7607; fax: 218-726-8240)
Email: cs@d.umn.edu
Website: [http://www.d.umn.edu/cs/degr/grad](http://www.d.umn.edu/cs/degr/grad)

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 33
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

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. It 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.

**Program Delivery**
This program is available:
- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**
The preferred undergraduate GPA for admittance to the program is 3.00.

The program is designed for students with undergraduate degrees in computer science or computer engineering.

Students with undergraduate degrees in fields other than computer science or computer engineering may be considered for admittance 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.

Applicants must submit their test score(s) from the following:
- GRE

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80
The preferred English language test is Test of English as Foreign Language

Key to [test abbreviations](#) (GRE, TOEFL, IELTS, MELAB).

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For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

**Plan A:** Plan A requires 17 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 27 major credits and 6 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

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.
Duluth Campus

Computer Science Minor

Computer Science
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Department of Computer Science, 1114 Kirby Drive, 320 Heller Hall, Duluth, MN 55812 (218-726-7607; fax: 218-726-8240)
Email: cs@d.umn.edu
Website: http://www.d.umn.edu/cs/degr/grad

• Program Type: Graduate minor related to major
• Requirements for this program are current for Fall 2011
• Length of program in credits (Masters): 8
• Length of program in credits (Doctorate): 8
• This program does not require summer semesters for timely completion.

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

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.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

At least 8 credits in computer science are required for a master's or doctoral minor.
Duluth Campus

Criminology M.A.
Sociology/Anthropology
College of Liberal Arts

Link to a list of faculty for this program.

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)
Email: crimma@d.umn.edu
Website: http://www.d.umn.edu/socanth/criminology/macrim_graduateprogram.php

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 38
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

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

Note: This program is not currently accepting new students. Please contact the Department of Sociology/Anthropology for more information about the status of the criminology M.A.

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 to 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.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree or foreign equivalent in a related field is required. Preference is given to applicants with undergraduate degrees in criminology, criminal justice, corrections, or sociology.

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.

Special Application Requirements:
Applicants must supply three letters of recommendation evaluating their 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 applicants must submit score(s) from one of the following tests:

- **TOEFL**
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to [test abbreviations](TOEFL).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

### Program Requirements

**Plan A:** Plan A requires 22 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 32 major credits and 6 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

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 cr), and CRIM 8300 (3 cr). Plan A students must enroll in CRIM 8777 - Master's 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.
**Duluth Campus**

**Criminology Minor**

*Sociology/Anthropology*  
*College of Liberal Arts*

Link to a list of faculty for this program.

**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)  
Email: crimma@d.umn.edu  

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 10
- This program does not require summer semesters for timely completion.

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

Note: This program is not currently accepting new students. Please contact the Department of Sociology/Anthropology for more information about the status of the Criminology M.A.

The core courses in the criminology program 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 to 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 criminology program provides an opportunity for both intellectual and professional development, and 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.

**Program Delivery**  
This program is available:  
- via classroom (the majority of instruction is face-to-face)

**Program Requirements**  
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A master's minor requires 4 credits in methods/statistics, 3 credits in theory, and 3 credits of electives.
Duluth Campus
Education M.Ed.
College of Education and Human Service Professions

Link to a list of faculty for this program.

Contact Information:
College of Education and Human Service Professions, 125 Bohannon Hall, 1207 Ordean Court, Duluth, MN 55812 (218-726-7156; fax: 218-726-7073)
Email: cehsp@d.umn.edu
Website: http://www.d.umn.edu/cehsp/gradprograms/cohort

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Education

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

The master of education (M.Ed.) is a professional development degree for educational scholars, including teachers and professionals with leadership or training roles in the health sciences, social services, community education, and business or industry. Professional development is achieved through critical reflection, theoretical investigation, and application of theory and research to practice in communities. The curriculum is based on the roles that educational scholars play as teachers, leaders, and change agents in formal, non-formal, and community-based settings.

Learners will develop skills in:
- Critical reflection
- Investigation and application of educational theory to practice
- Evaluation, execution, and effective communication of educational research
- Intercultural competence
- The creation of, and participation in, communities of learners as professionals
- Leadership for educational reform

Core courses are delivered primarily online with one face-to-face weekend session during the first month of each semester. The required core courses are delivered over two years for professionals who wish to earn the graduate degree while maintaining full-time employment. Students are admitted to an identified cohort and register for two years of core curriculum with the same cohort.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 2.80.

A bachelor's degree is required for admission.

Preferred candidates will have a GPA of 3.00 or higher and two years professional experience or demonstrated experience working with learners.

Special Application Requirements:
Please submit the following materials to: Department of Education, University of Minnesota Duluth, Attn: Karen Mehle, 150 EduE, 412 Library Drive, Duluth, MN 55812
- Application form
- $31 non-refundable application fee
- Official transcripts sent directly from the undergraduate institution to the Collegiate Graduate Program Office at the address immediately above
- Two letters of recommendation, to the attention of the Collegiate Graduate Programs Committee, also at the address immediately above
- A resume documenting education and work experience

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- A two- to three-page goal statement

Email Karen Mehle (kmehle@d.umn.edu) in the Graduate Programs Office with specific questions about admission.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to test abbreviations (TOEFL).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan C: Plan C requires 24 major credits and 6 credits outside the major. There is no final exam. A capstone project is required.

Capstone Project: Students work throughout the program to develop and carry out a research project, producing a completed thesis by the end of the program.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

The M.Ed. cohort program has a 24-credit core curriculum; remaining credits are electives. The sequence of core courses is designed so that they build and rely on each other in a way that integrates content from one semester to the next. The research component of the program builds through the two years and is structured to help cohort members complete the final project in that time. Specific products at the end of each term lead to a completed project.

Each semester, students will be expected to complete the following.

By the end of:

Semester 1: Select a topic and complete a "mini" literature review
Semester 2: Write the question to be researched and complete literature review
Semester 3: Determine research method and write a proposal and submit IRB application
Semester 4: Gather and analyze data, complete research thesis

Coursework:

Semester 1:
EDUC 7001 - Introduction to Graduate Study (2 cr)
EDUC 7008 - Foundations of Teaching and Learning: Curriculum Theory and Design (4 cr)

Semester 2:
EDUC 7004 - Educational Action Research and Inquiry (4 cr)
EDUC 7002 - Human Diversity and Exceptionality (2 cr)

Semester 3:
EDUC 7009 - Assessment of Student Learning (3 cr)
EDUC 7011 - Integrated Research in Practice (3 cr)

Semester 4:
EDUC 7006 - Ethics and Professionalism in Education (2 cr)
EDUC 5990 - Research Project (4 cr)

Electives are determined in consultation with the director of graduate studies (first year) and the graduate adviser (second year). All policies relating to degree requirements are detailed in the Student Handbook.
Duluth Campus

Educational Computing and Technology Postbaccalaureate Certificate

Continuing Education

Link to a list of faculty for this program.

Contact Information:
Continuing Education, 1049 University Drive, 103 Darland, Duluth, MN, 55812 (218-726-8149; fax: 218-726-7888)
Email: sgonia1@d.umn.edu

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2011
- Length of program in credits: 16
- This program does not require summer semesters for timely completion.
- Degree: Certificate in Educational Computing/Technology

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

This certificate is designed for students who are interested in expanding their knowledge and skills in educational computing and technology. The certificate provides basic through advanced training in computer and related technologies. The hands-on program builds upon basic computer literacy skills such as micro computing, word processing, spreadsheets, databases, graphics, desktop publishing, and the use of peripherals such as CD-ROM, scanners, digital cameras, digital video cameras, and web cams. Students will expand their knowledge and skills in additional technologies including Power Point, Hyper Studio, the Internet/World Wide Web, electronic mail, web quests, video conferencing, digital video editing, and a variety of teacher administrative software focusing on the further development of technology skills and their infusion into the P-12 classrooms.

The program is designed for professionals, paraprofessionals, and others who wish to concentrate in educational computing and technology. Student projects are tailored to personal interests and emphasize practical application for use in school classroom settings. Students can earn the certificate at one of three levels: undergraduate, graduate, or noncredit.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 2.50.

Applicants must have completed a bachelor's degree and have a preferred undergraduate GPA of at least 2.50 or a graduate GPA of at least 2.70.

Students should submit a Certificate Application before completing the required certificate coursework. However, students have one year from the time they complete the required coursework to submit the Certificate Application.

After one year, students are no longer eligible for admission to the certificate program without the consent of the certificate faculty liaison. In some cases, additional coursework may be required. Admission to the certificate program after one year is not guaranteed, but is granted on a case-by-case basis. Instructions for the Certificate Application can be found at: http://www.d.umn.edu/ce/learningopportunities/certificates/applicprocess.html.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to test abbreviations (TOEFL).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.
Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.00 is required for students to remain in good standing.

Required Coursework
EDUC 5412 - The Computer in Education (0.5 - 4.0 cr)
EDUC 5413 - Teaching With Technology (4.0 cr)
EDUC 5414 - Using Technology for the Administrative Tasks of Teaching (4.0 cr)
EDUC 5415 - Advanced Educational Media Production (4.0 cr)
**Duluth Campus**

**Electrical And Computer Engineering Minor**

*Electrical & Computer Engineering*

Swenson College of Science and Engineering

Link to a [list of faculty](#) for this program.

**Contact Information:**
ECE Graduate Program, 271 MWAH, 1023 University Drive, Duluth, MN 55812 (218-726-6830; fax: 218-726-7267)
Email: ece@d.umn.edu
Website: [http://www.d.umn.edu/ece/gradProgram/index.html](http://www.d.umn.edu/ece/gradProgram/index.html)

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

The graduate program in electrical and computer engineering is oriented towards students and engineering practitioners in the private and public sectors who are interested in advanced coursework and applied research. The minor allows students to focus on one of the core departmental strengths of communications and signal processing, VLSI and nanoscale optoelectronics, medical instrumentation and control systems, and intelligent transportation systems.

**Program Delivery**
This program is available:
- via classroom (the majority of instruction is face-to-face)

**Program Requirements**
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A master's minor requires 6 credits in electrical and computer engineering courses. Individual programs must be approved by the director of graduate studies of electrical and computer engineering program.
Duluth Campus
Engineering M.Eng.
Swenson College of Science & Engineering
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Director of Graduate Studies, M.Eng. Program, Engineering Building 176, 1303 Ordean Court, Duluth, MN 55812 (218-726-7126; fax: 218-726-6907)
Email: rDavis@d.umn.edu
Website: http://www.d.umn.edu/scse/degrees/MEng/index.html

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Engineering

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

The professional master of engineering emphasizes the practice of engineering in either the private or public sector. The program focuses on developing competencies in the areas of engineering design, problem solving, and practice beyond what can be achieved in earning a bachelor of science degree in a given engineering discipline.

An M.Eng. graduate student is expected to have a focus and degree designation in one of the core UMD disciplines of civil engineering, chemical engineering, electrical and computer engineering, industrial engineering, or mechanical engineering.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Completion of an undergraduate degree in an ABET accredited engineering program, or upon approval by the director of graduate studies, in a related discipline, e.g., computer science, physics, etc.

Special Application Requirements:
A complete application includes:
- The completed program application form, either hard copy or online.
- Official transcript(s)
- Two letters of recommendation--academic and/or professional references--sent to Dr. Richard Davis, Director of Graduate Studies, 176 Engineering Building, 1303 Ordean Court, Duluth, MN 55812
- A recent GRE score (recommended but not required)
- Summary of academic and professional background, licensure as appropriate, academic goals related to this degree program (not to exceed one page)

Applicants must submit their test score(s) from the following:
- GRE

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to test abbreviations (GRE, TOEFL).
For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

**Program Requirements**

**Plan C:** Plan C requires 15 to 27 major credits and 3 to 15 credits outside the major. There is no final exam. A capstone project is required. The **Capstone Project:** All students take 3-6 credits of project courses within their major. As part of these credits, a project report or presentation may be required by the departmental adviser and department. This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The M.Eng. degree program is primarily a coursework degree program with a minimum of 3 credits and a maximum of 6 credits allocated to a design project to be arranged between the departmental adviser and student. The 30 credits require a minimum of 14 credits at 5XXX or higher, and a cap of 6 credits on 4XXX courses. There is no requirement for a final exam above and beyond what is required in individual courses.
Duluth Campus

Engineering Management M.S.E.M.
UMD Mechanical/Industrial Engineering
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
MSEM Director of Graduate Studies, University of Minnesota Duluth, 229 Voss-Kovach Hall, 1305 Ordean Court, Duluth, MN 55812
(218-726-8117; fax: 218-726-8581)
Email: msem@d.umn.edu
Website: http://www.d.umn.edu/mie/MSEM

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 30 to 31
- This program does not require summer semesters for timely completion.
- Virginia, Hibbing, and Grand Rapids (MN).
- Degree: Master of Science in Engineering Management

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

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 for remote sites by interactive television. Full-time enrollment is possible and the course structure allows for unique research opportunities.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants should have an undergraduate degree in engineering, or another technical major and a substantial background in engineering.

Applicants must provide two letters of recommendation concerning their academic ability and readiness for graduate education.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.
Program Requirements

**Plan A:** Plan A requires 12 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 12 major credits and 3 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** The Plan B project is a capstone project in which each student should utilize their acquired engineering management skills and to demonstrate their mastery of engineering management concepts by completing a well-defined project on time and documenting the project with a formal paper and an oral presentation.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

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 interests 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.
Duluth Campus

Engineering Management Minor
UMD Mechanical/Industrial Engineering
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Director of Graduate Studies (MSEM), University of Minnesota Duluth, 229 Voss-Kovach Hall, 1305 Ordean Court, Duluth, MN 55812
(218-726-8117; fax: 218-726-8581)
Email: msem@d.umn.edu
Website: http://www.d.umn.edu/mie/MSEM

• Program Type: Graduate minor related to major
• Requirements for this program are current for Fall 2011
• Length of program in credits (Masters): 6
• Length of program in credits (Doctorate): 6
• This program does not require summer semesters for timely completion.

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

The minor in engineering management provides engineering and science graduate students 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. To meet the needs of practitioners, courses are offered in the evening and are available to remote sites by interactive television.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

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.
Duluth Campus

English M.A.

College of Liberal Arts

Link to a list of faculty for this program.

Contact Information:
Department of English, 410 Humanities, 1201 Ordean Court, University of Minnesota Duluth, Duluth, MN 55812 (218-726-8228; fax: 218-726-7457)
Email: engl@d.umn.edu
Website: http://www.d.umn.edu/engl

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 30 to 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Arts

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

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.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

An undergraduate degree including at least 30 credits in English.

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.

Applicants must submit their test score(s) from the following:
• GRE

International applicants must submit score(s) from one of the following tests:
• TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 600
• IELTS
  - Total Score: 7
• MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.
Program Requirements

Plan B: Plan B requires 24 to 25 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

Capstone Project: The Plan B project is comprised of two separate projects totaling 120 hours of effort before taking the final 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.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

Language Requirement: Reading knowledge of a language listed below.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

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 should select courses from literature and literary analysis, linguistics, composition/rhetoric, print culture, publishing, or courses closely related to their field of concentration.

The 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.

The 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.

The 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.
Duluth Campus
English Minor
English
College of Liberal Arts

Link to a list of faculty for this program.

Contact Information:
Department of English, 410 Humanities, 1201 Ordean Court, University of Minnesota Duluth, Duluth, MN 55812 (218-726-8228; fax: 218-726-7457)
Email: engl@d.umn.edu
Website: http://www.d.umn.edu/engl

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 8
- This program does not require summer semesters for timely completion.

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

The master's minor 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 emphases: a literary studies emphasis for concentrated study of literature, an interdisciplinary emphasis in English studies, and an emphasis in publishing and print culture.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.
Duluth Campus

Environmental Education M.E.Ed.

College of Education and Human Service Professions

Link to a list of faculty for this program.

Contact Information:
Center for Environmental Education, 122 Sports and Health Center, 1216 Ordean Court, Duluth, Minnesota 55812-3032 (218-726-8677)
Email: ceed@d.umn.edu
Website: http://www.d.umn.edu/ceed/mastersdegree-overview.html

- Program Type: Master’s
- Requirements for this program are current for Fall 2011
- Length of program in credits: 34
- This program does not require summer semesters for timely completion.
- The program is delivered primarily on the UMD campus. Portions of some courses are delivered at the Wolf Ridge Environmental Learning Center (Finland, MN) where some Wolf Ridge students complete the Continuing Education Environmental Education Certificate programs.
- Degree: Master of Environmental Education

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

The purpose of the master of environmental education is to develop advanced practitioners in environmental education (EE) who will take on leadership roles through positions such as EE specialists and directors at nature centers, outdoor and EE centers, natural resource agencies, conservation groups, park and recreation programs, and in P-16 school settings. A minimum of 34 credits is required for the degree. Core requirements include teaching methodology in formal and non-formal settings; program development, management, and evaluation; theory; and research. Elective courses are used for supporting final project and/or specific areas of interest. Final project options include a research-based thesis, research-based journal article, field project, or curriculum project.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor’s degree from an accredited U.S. college or university or an equivalent degree from a recognized college or university in another country.

Special Application Requirements:
Applications are due February 1, with admission for the following fall semester. (Under extenuating circumstances, applications may be considered past the deadline for admission.)

All application materials should be submitted directly into the ApplyYourself application system. Your application will not be reviewed until all of the required materials are submitted successfully. Incomplete applications cannot be considered for admission.

Required materials include the following:
- Transcripts
- Writing sample that demonstrates suitability for graduate-level study and/or formal academic writing ability
- Resume
- Two work samples that communicate suitability for graduate-level study in EE, such as a lesson plan, grant proposal, article, capstone project, etc.
- Three letters of recommendation that speak to the applicant's potential as a graduate student and EE professional.

International applicants must submit score(s) from one of the following tests:
• TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19
- Paper Based - Total Score: 550

- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan C: Plan C requires 28 major credits and null credits outside the major. There is no final exam. A capstone project is required.

Capstone Project: Final project options include a research-based project or journal article, field project, or curriculum project.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

The degree is intended to be completed in two years, and a minimum of 34 credits is required. Coursework is offered primarily on-campus (in person); some electives are available online. Summer coursework is limited, and most students spend summers away from campus gaining relevant experience.

Foundations

ENED 5165 - Theories and Models in Outdoor Education (2.0 cr)

Instruction

ENED 4163 - Outdoor Education Methods (3.0 cr)
ENED 5850 - Classroom Applications (2.0 cr)

Program Development, Implementation, and Evaluation

ENED 5855 - Programming for School Systems (3.0 cr)
ENED 4315 - Operations and Management (4.0 cr)
ENED 5625 - Program Development and Evaluation (3.0 cr)

Research

ENED 5998 - Outdoor Education Seminar (1.0 cr)
ENED 5560 - Current Research and Issues (3.0 cr)
ENED 5100 - Research Design and Methods in the Social Sciences (3.0 cr)
EHS 5990 - Research Project (6.0 cr)

Electives

Courses supporting research area or career goals (4-6 cr)
Duluth Campus

Environmental Education Postbaccalaureate Certificate

Education, Health, Physical Education & Recreation

College of Education and Human Service Professions

Link to a list of faculty for this program.

Contact Information:
Continuing Education, 403 Darland Administration Building, 1049 University Drive, Duluth, MN 55812 (218-726-8149)
Email: sgonia1@d.umn.edu

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2011
- Length of program in credits: 18
- This program does not require summer semesters for timely completion.
- Wolf Ridge Environmental Learning Center
- Degree: Certificate in Environmental Education

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

This program is designed primarily for teachers and interpretive naturalists, but is open to anyone with a bachelor's degree and an interest in pursuing a career as an environmental educator.

The program emphasizes interpretive skills in the natural sciences, education on environmental issues, and helping people recognize and solve potential environmental problems. Three main areas of concentration are education, social sciences, and natural sciences.

The 18-credit program is designed to be completed in one to two years. Twelve credits of core courses that provide theoretical and practical application of environmental education concepts plus six elective credits to strengthen competency in an appropriate area of training.

Program Delivery
This program is available:
* via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 2.50.

Admission to the program is generally approved for students who have successfully completed a bachelor's degree and have satisfactorily completed at least 70 percent of college courses attempted.

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.70 is required for students to remain in good standing.

Required Coursework
ENED 4163 - Outdoor Education Methods (3.0 cr)
or ENED 4555 - Foundations of Environmental Education (3.0 cr)
or ENED 5165 - Theories and Models in Outdoor Education (2.0 cr)
or ENED 5167 - Research and Issues in Outdoor Education (2.0 cr)
or ENED 3342 - Field Interpretive Techniques II (3.0 cr)
or ENED 5560 - Current Research and Issues (3.0 cr)
ENED 5555 - Environmental Education for Practicing Educators (2.0 cr)
ENED 3341 - Field Interpretive Techniques I (3.0 cr)
Environmental Health and Safety M.Env.Hlth.Saf.
UMD Mechanical/Industrial Engineering
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Swenson College of Science and Engineering, 229 Voss-Kovach Hall, 1305 Ordean Court, Duluth, MN 55812 (218-726-8117)
Email: mehs@d.umn.edu
Website: http://www.d.umn.edu/mehs

• Program Type: Master's
• Requirements for this program are current for Fall 2011
• Length of program in credits: 36
• This program does not require summer semesters for timely completion.
• Degree: Master of Environmental Health and Safety

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

The master of environmental health and safety (M.E.H.S.) program prepares its graduates for professional careers in environmental health and safety—encompassing occupational safety, industrial hygiene, ergonomics, risk management, and environmental health. However, the program strives not only to provide academic-based knowledge, but also the technical and practical skills necessary to be a successful EHS professional. While coursework covers a broad range of EHS topics, students may also choose areas in which they would like to explore more in-depth.

Ultimately, the mission of the M.E.H.S. program is to produce highly-regarded and sought-after graduates who have the requisite skills and knowledge to practice environmental health and safety effectively in a diverse range of occupations and will do so in a competent, professional, and ethical manner.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants preferably will have a baccalaureate degree in a science, engineering, or other E.H.S.-related field. All degrees, however, must have been earned at an accredited college or university.

Applicants must have earned a grade of C or better at the collegiate level in the following introductory coursework: chemistry with a lab component, calculus, and statistics. A combined Verbal and Quantitative GRE score of 1,000 or better is preferred.

In addition, preferred applicants will have work experience related to E.H.S. and have completed collegiate-level coursework in introductory physics, human biology and/or physiology, and psychology.

Special Application Requirements:
At present, the M.E.H.S. program does NOT accept applications through the University of Minnesota's Apply Yourself system. Instead, an application package must be completed and received by the M.E.H.S. program office no less than one month prior to the term in which the student wishes to enroll. Packages that are incomplete or received less than one month prior to the start of a term will be reviewed for admission effective the following term. Applicants are also responsible for obtaining information on and following any University-level admission deadlines and requirements.

Applicants must submit the following items:
- Application form (see website at http://www.d.umn.edu/mehs)
- Official transcript(s) indicating completion of a baccalaureate degree program and grades obtained in the prerequisite courses
- Resume or CV
- Three letters of recommendation
- GRE General Test scores
- TOEFL score (international students only)
- Answers to essay question on the E.H.S. related scenarios (download from program website)
Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to test abbreviations (GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan B: Plan B requires 30 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

Capstone Project: The Plan B capstone project requires a student to apply knowledge and skills acquired from the M.E.H.S. coursework and demonstrate their mastery of E.H.S.-related material and concepts in identifying and addressing a particular concern. The project is part of a minimum six-week cooperative internship conducted in an industrial, governmental, or other organization having an established safety program or in the process of implementing a safety program. A report on the project must be prepared following the guidelines for an article to be submitted to a relevant journal in E.H.S. (e.g., professional safety) and an oral presentation is required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

Other requirements include:
- 18 core courses in the M.E.H.S. program
- 9 elective course credits as approved by the M.E.H.S. program
- 3 cooperative internship credits, obtained only once an approved Plan B Master's report is submitted to the program office within 12 months of completing the 27 course credits (unless a formal extension is granted)
- a minimum of two semesters for the residence requirement
Fetal Alcohol Spectrum Disorders Postbaccalaureate Certificate

Continuing Education

Contact Information:
Continuing Education, 403 Darland Administration Building, Duluth, MN 55812 (218-726-8149; fax: 218-726-7888)
Website: http://www.d.umn.edu/ce/learningopportunities/certificates/fasd

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2011
- Length of program in credits: 12
- This program requires summer semesters for timely completion.

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

Fetal alcohol spectrum disorders (FASD) are a growing issue for families across the country. Teachers and other service providers want and need more intense training devoted entirely to FASD. Children and adolescents with fetal alcohol spectrum disorders are in schools, daycare centers, and mental health agencies across the state and nation. Program courses are aligned with research-based best practices in the field of ASD.

This certificate, offered entirely online, is designed for special education teachers, prospective teachers, and other related professionals who work with children and youth with fetal alcohol spectrum disorders. This certificate holds the distinction of being the only program of its kind in the State of Minnesota.

This three-course online certificate offers the opportunity to expand knowledge and expertise in the area of FASD. Participants will learn research-based best practices in this area. The certificate is designed to be completed in one year.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 2.50.

Applicants must have completed a bachelor's degree and have a preferred undergraduate GPA of at least 2.50 or a graduate GPA of at least 2.70.

At least a 75 percent successful completion rate on all college coursework.
Individual certificates have additional standards. View the additional requirements of individual certificates.
Students cannot be admitted to more than two certificate programs at one time.
Each certificate application should include a check or money order (payable to UMD) to cover the non-refundable certificate application fee of $35.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

Key to test abbreviations (TOEFL).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.
Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.70 is required for students to remain in good standing.

Students cannot take both graduate and undergraduate courses during the same term.
If admitted to the graduate certificate program, students must pay graduate tuition and take all of the coursework for graduate credit. The same rule applies to undergraduate certificates.

Transfer Credits:
A minimum of 75 percent of the certificate coursework must be taken at UMD.

Required Coursework
SPED 4850 - Foundations of Fetal Alcohol Spectrum Disorder (4.0 cr)
SPED 5850 - Foundations of Fetal Alcohol Spectrum Disorder (4.0 cr)
SPED 4860 - Social and Communication Skills for Individuals with Fetal Alcohol Spectrum Disorder (4.0 cr)
SPED 5860 - Social and Communication Skills for Individuals with Fetal Alcohol Spectrum Disorder (4.0 cr)
SPED 4870 - Professional Methods for Working with Individuals with Fetal Alcohol Spectrum (4.0 cr)
SPED 5870 - Professional Methods for Working with Fetal Alcohol Spectrum (4.0 cr)
Duluth Campus
Geological Sciences M.S.
Geological Sciences
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Department of Geological Sciences, University of Minnesota Duluth, 229 Heller Hall, 1114 Kirby Drive, Duluth, MN 55812 (218-726-7239; fax: 218-726-7218)
Email: geol@d.umn.edu
Website: http://www.d.umn.edu/geology

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

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

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, the Natural Resources Research Institute, and the Precambrian Research Center.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

A four-year B.S. degree in geology or a related field in engineering, basic science, or mathematics is required.

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.

Applicants must submit their test score(s) from the following:
• GRE

International applicants must submit score(s) from one of the following tests:
• TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
• IELTS
  - Total Score: 6.5
• MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.
Program Requirements

**Plan A:** Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

**Plan B:** Plan B requires 14 major credits and 6 credits outside the major. The final exam is written.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

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 the oral defense of a 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.
Duluth Campus
Geological Sciences Minor
Geological Sciences
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Department of Geological Sciences, University of Minnesota Duluth, 229 Heller Hall, 1114 Kirby Drive, Duluth, MN 55812 (218-726-7239; fax: 218-726-7218)
Email: geol@d.umn.edu
Website: http://www.d.umn.edu/geology

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

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

The geological sciences graduate program 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, the Natural Resources Research Institute, and the Precambrian Research Center.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.

A master's minor requires at least 6 credits. Coursework is chosen in consultation with the student's adviser and the director of graduate studies in geological sciences.
Duluth Campus

Integrated Biosciences M.S.
Swenson College of Science & Engineering
University of Minnesota Duluth

Link to a list of faculty for this program.

Contact Information:
Integrated Biosciences Graduate Program, University of Minnesota, 251 Swenson Science Building, 1035 Kirby Drive, Duluth, MN 55812 (218-726-6898; fax: 218-726-8152)
Email: ibs@d.umn.edu
Website: http://www.d.umn.edu/ibs

• Program Type: Master's
• Requirements for this program are current for Fall 2011
• Length of program in credits: 30
• This program requires summer semesters for timely completion.
• Degree: Master of Science

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

The all-University integrated biosciences graduate program offers study toward the master of science (M.S.) degree under Plan A (coursework and original thesis). The program has two areas of emphasis: cell, molecular, and physiological (CMP) biology and ecology, organismal, and population (EOP) biology.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor’s degree or equivalent from an accredited college or university in the biological or physical sciences or a related field.

Recommended undergraduate courses for applicants pursuing the M.S. degree include one year each of chemistry, biology, and physics. One semester of calculus is also recommended. Applicants are strongly encouraged to have taken other advanced courses in chemistry, biology, additional calculus, and introductory statistics.

Applicants must submit their test score(s) from the following:
• GRE

International applicants must submit score(s) from one of the following tests:
• TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
• IELTS
  - Total Score: 6.5
• MELAB
  - Final score: 80

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.
Program Requirements

Plan A: Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Required Coursework

- IBS 8011 - Integrated Biological Systems I (2.0 cr)
- IBS 8012 - Integrated Evolutionary Processes (2.0 cr)
- IBS 8099 - The Biological Practitioner (1.0 cr)
- STAT 5411 - Analysis of Variance (3.0 cr)
- IBS 8020 - Integrated Biosciences Colloquia (1.0 cr)
- IBS 8030 - IBS Research Club (1.0 cr)
Duluth Campus
Integrated Biosciences Minor
Swenson College of Science & Engineering
Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Integrated Biosciences Graduate Program, University of Minnesota, 251 Swenson Science Building, 1035 Kirby Drive, Duluth, MN 55812 (218-726-6898; fax: 218-726-8152)
Email: ibs@d.umn.edu
Website: http://www.d.umn.edu/ibs

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- Length of program in credits (Doctorate): 12
- This program does not require summer semesters for timely completion.

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

The all-University integrated biosciences graduate program offers students an opportunity to study in one of two areas of emphasis: cell, molecular, and physiological (CMP) biology and ecology, organismal, and population (EOP) biology.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.

A master's minor in integrated biosciences requires 6 credits. The doctoral minor requires 12 credits.
**Duluth Campus**

**Integrated Biosciences Ph.D.**  
*Swenson College of Science & Engineering*  
*University of Minnesota Duluth*

Link to a list of faculty for this program.

**Contact Information:**  
Integrated Biosciences Graduate Program, University of Minnesota, 251 Swenson Science Building, 1035 Kirby Drive, Duluth, MN 55812 (218-726-6898; fax: 218-726-8152)  
Email: ibs@d.umn.edu  
Website: http://www.d.umn.edu/ibs

- Program Type: Doctorate  
- Requirements for this program are current for Fall 2011  
- Length of program in credits: 56  
- This program requires summer semesters for timely completion.  
- The Integrated Biosciences Ph.D. is an All-University program delivered on the Twin Cities and Duluth Campuses. The University of Minnesota Twin Cities is the degree granting authority for the Integrated Biosciences Ph.D. program in Duluth.  
- Degree: Doctor of Philosophy

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

The all-university integrated biosciences graduate program offers study toward the doctor of philosophy (Ph.D.) degree. The program has two areas of emphasis: cell, molecular, and physiological (CMP) biology and ecology, organismal, and population (EOP) biology.

**Program Delivery**  
This program is available:  
- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**  
The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree or equivalent from an accredited college or university in the biological or physical sciences or a related field.

Recommended undergraduate courses for applicants pursuing the Ph.D. degree include one year each of chemistry, biology, physics, calculus, and advanced chemistry. One semester (minimum) of statistics is also recommended.

Additional recommended courses for students in the ecology, organismal, and population (EOP) emphasis include one year of calculus, one semester each of ecology and evolutionary biology, along with one course in two of the following subjects: genetics, cell biology, biochemistry.

Additional recommended courses for students in the cell, molecular, and physiological (CMP) emphasis include one year of organic chemistry plus one course in each of the following: genetics, cell biology and biochemistry.

Applicants must submit their test score(s) from the following:  
- GRE

International applicants must submit score(s) from one of the following tests:  
- TOEFL  
  - Internet Based - Total Score: 79  
  - Internet Based - Writing Score: 21  
  - Internet Based - Reading Score: 19  
  - Paper Based - Total Score: 550  
- IELTS  
  - Total Score: 6.5  
- MELAB  
  - Final score: 80

The preferred English language test is Test of English as Foreign Language.
Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

**Program Requirements**
20 credits are required in the major.
12 credits are required outside the major.
24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

**Ph.D. Written Preliminary Examination**—In addition to completing the curriculum for the major and internal related fields, students will be required to pass both a written and oral preliminary examination prior to completing the Ph.D. program. The preliminary written examination will be administered once the student has completed the majority of the required coursework. This will typically occur in the summer of the second year. The written examination will consist of a completed NIH or NSF grant application for the student's proposed research project. The project will be evaluated by the Thesis Examining Committee, which will also serve as the student's Final Oral Examining Committee to provide continuity of advice during the length of the student's research program.

**Ph.D. Oral Preliminary Examination**—The oral preliminary examination will be administered within two months of the successful completion of the preliminary written examination. The examination will be administered by the graduate faculty according to Graduate School regulations and all students will be required to pass the oral examination to continue in the Ph.D. program. Within one semester of passing the preliminary oral examination, each Ph.D. student must file a Thesis Proposal Form with the Graduate School.

**Ph.D. Final Oral Defense**—It is anticipated that most students will complete the requirements for the Ph.D. degree within five years. The final oral defense will be conducted by the graduate faculty according to Graduate School regulations. It will consist of a public seminar presented by the student.

**Required Coursework**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IBS 8011</td>
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</tr>
</tbody>
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**Duluth Campus**

**Liberal Studies M.L.S.**  
*Sociology/Anthropology*  
**College of Liberal Arts**

Link to a [list of faculty](#) for this 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 (218-726-8437)

- Program Type: Master's  
- Requirements for this program are current for Fall 2011  
- Length of program in credits: 32  
- This program does not require summer semesters for timely completion.  
- Degree: Master of Liberal Studies

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

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.

**Program Delivery**  
This program is available:  
- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**  
The preferred undergraduate GPA for admittance to the program is 3.00.

Entering M.L.S. students should have a bachelor's degree or equivalent.

Upon receipt of the Graduate School application form, students must then forward the following materials to the Graduate School office at UMD by the deadline: the completed application form, two official transcripts of undergraduate and graduate grade records, a letter stating in narrative form their reasons for wishing to pursue the M.L.S. degree and describing their education and career experiences, three letters of recommendation from persons in a position to evaluate the applicant's potential for success, and a non-refundable application fee.

International applicants must submit score(s) from one of the following tests:  
- **TOEFL**  
  - Internet Based - Total Score: 79  
  - Internet Based - Writing Score: 21  
  - Internet Based - Reading Score: 19  
  - Paper Based - Total Score: 550  
- **IELTS**  
  - Total Score: 6.5  
- **MELAB**  
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).  

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.

**Program Requirements**  
**Plan B:** Plan B requires 18 major credits and 14 credits outside the major. The final exam is oral. A capstone project is required.  
**Capstone Project:** The Plan B project is an expansion of work done in a course or another topic of special interest. Plan B papers and projects are submitted to the examining committee before the student's final oral presentation and examination and represent 120 hours.
of independent research.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.5 is required for students to remain in good standing.

The M.L.S. is offered only under Plan B. Students 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. Inclusion of 4xxx courses on degree program forms is subject to adviser and director of graduate studies approval.
Duluth Campus
Liberal Studies Minor
Sociology/Anthropology
College of Liberal Arts

Link to a list of faculty for this 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  (218-726-8437)

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

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

A minor in liberal studies allows current graduates to broaden their intellectual horizons through in depth exploration of a variety of interdisciplinary topics.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.

A master's-level minor in liberal studies requires 6 credits of courses approved by the director of graduate studies.
Duluth Campus
Linguistics Minor
Writing Studies
College of Liberal Arts

Link to a list of faculty for this program.

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)
Email: mlinn@d.umn.edu
Website: http://www.d.umn.edu/writ

• Program Type: Graduate free-standing minor
• Requirements for this program are current for Fall 2011
• Length of program in credits (Masters): 6
• This program does not require summer semesters for timely completion.

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

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.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.

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).
**Duluth Campus**

**Music M.M.**

**Music**

**School of Fine Arts**

Link to a list of faculty for this program.

**Contact Information:**
Department of Music, University of Minnesota Duluth, 1201 Ordean Court, Duluth, MN, 55812 (218-728-8208; fax: 218-726-8210)
Email: mu@d.umn.edu

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Music

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

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

**Accreditation**
This program is accredited by National Association of Schools of Music.

**Program Delivery**
This program is available:
- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have an undergraduate degree in music.

In addition, the following must be submitted for review by the music graduate committee: a completed Department of Music Graduate Study Application available from www.d.umn.edu/music, which includes a sample of professional writing (a three- to five-page paper addressing current issues in music education or music performance), and a CD or DVD of recent performances, teaching demonstrations, or rehearsals. An entrance performance audition on the major instrument is required for those seeking admission to the M.M. in Music Performance. Candidates seeking admission as vocal performers, choral conductors, and collaborative pianists must demonstrate foreign language proficiency or enroll in remedial courses upon acceptance.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.
Program Requirements

**Plan B:** Plan B requires 24 major credits and 6 credits outside the major. The final exam is written and oral. A capstone project is required.

**Capstone Project:** For the M.M. in music education, the Plan B Project is a paper or thesis project. This paper is a comprehensive research analysis and study in the field of music education in the standard five-chapter thesis format. This Plan B Project Paper constitutes 6 credits of the degree program and is generally begun in the third semester of study. A comprehensive oral examination covers the research methodology and content of the Plan B Project Paper. For the M.M. in music performance, the student's Graduate Recital fulfills the Plan B Project requirements.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The Plan B master of music requires 30 credits. The M.M. in music education 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 M.M. in music performance requires 14 credits in performance/pedagogy (including the Graduate Recital and instrumental and vocal ensembles), 8 credits in music theory and literature, 6 credits in research/foundations courses, 2 elective credits, and a recital. The Graduate 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.
Duluth Campus

Music Minor

Music
School of Fine Arts

Link to a list of faculty for this program.

Contact Information:
Department of Music, University of Minnesota Duluth, 1201 Ordean Court, Duluth, MN, 55812 (218-728-8208; fax: 218-726-8210)
Email: mu@d.umn.edu

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

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

The 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 may take courses in musicianship, theory, history, research, and education/pedagogy.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses towards program requirements is not permitted.
Duluth Campus

Physics M.S.
Swenson College of Science and Engineering

Link to a list of faculty for this program.

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)
Email: phys@d.umn.edu
Website: http://www.d.umn.edu/~jmaps/gradpgm

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 31
- This program requires summer semesters for timely completion.
- Degree: Master of Science

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

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.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

An undergraduate degree in physics or the equivalent is required.

Three letters of recommendation are required for assistantship support.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Reading Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
Plan A: Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 14 major credits and 6 credits outside the major. The final exam is oral.
This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

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.
Duluth Campus
Physics Minor
Swenson College of Science and Engineering

Link to a list of faculty for this program.

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)
Email: phys@d.umn.edu
Website: http://www.d.umn.edu/~jmaps/gradpgm

• Program Type: Graduate minor related to major
• Requirements for this program are current for Fall 2011
• Length of program in credits (Masters): 6
• Length of program in credits (Doctorate): 6
• This program does not require summer semesters for timely completion.

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

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.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Program Requirements
Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A master's minor requires 6 credits, of which no more than 1 credit can be from PHYS 5090.
Duluth Campus
Social Work M.S.W.
Social Work
College of Education and Human Service Professions

Link to a list of faculty for this program.

Contact Information:
Department of Social Work, 220 Bohannon Hall, 1207 Ordean Court, Duluth, MN 55812 (218-726-7245; fax: 218-726-7185)
Email: sw@d.umn.edu
Website: http://www.d.umn.edu/sw

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 49
- This program does not require summer semesters for timely completion.
- Degree: Master of Social Work

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

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.

Accreditation
This program is accredited by Council of Social Work Education (CSWE).

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants should have a bachelor's degree with a solid background in the liberal arts, including courses in cultural studies, and behavioral and social sciences.

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. 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.

Special Application Requirements:
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. 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. Course credits are not awarded for non-academic or professional "life experience."

Applicants with a bachelor of social work degree from a program accredited by the Council of Social Work Education may apply for the Advanced Standing Program.

The following may be submitted through the online application or be sent directly to the department: the Department's Supplemental Application form, a personal statement, a writing sample, and a resume. Three letters of recommendations must be accompanied by the department's recommendation form. Standard Program students are admitted in the fall semester only. Advanced Standing Program students have the option of starting either in the summer or fall semester.
International applicants must submit score(s) from one of the following tests:

- **TOEFL**
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

- **IELTS**
  - Total Score: 6.5

- **MELAB**
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

**Program Requirements**

**Plan C:** Plan C requires 49 major credits and null credits outside the major. The final exam is oral. A capstone project is required. **Capstone Project:** The capstone project is an M.S.W. Portfolio. The UMD Department of Social Work Portfolio was designed to help students meaningfully integrate, on an ongoing basis, the knowledge and skills they acquire throughout the master's curriculum. It will also help ensure that all M.S.W. graduates demonstrate competence in those learning areas that we believe are key to quality masters-level social work practice.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

The Standard Program requires 51 credits and the Advanced Standing Program requires 34 credits, a capstone project, and final examination. The program requires two field placements in human service agencies (one field placement for students with advanced standing). A level of personal and professional competence, as indicated by social work course and field placement evaluations, is required.
**Duluth Campus**

**Social Work Minor**

**Social Work**

**College of Education and Human Service Professions**

Link to a [list of faculty](#) for this program.

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

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2011
- Length of program in credits (Masters): 6
- This program does not require summer semesters for timely completion.

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

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.

**Program Delivery**
This program is available:
- via classroom (the majority of instruction is face-to-face)

**Program Requirements**
Use of 4xxx courses towards program requirements is not permitted.
Duluth Campus
Special Education M.Spec.Ed.
Education
College of Education and Human Service Professions

Link to a list of faculty for this program.

Contact Information:
Department of Education, 150 EduE, 412 Library Drive, Duluth, MN 55812 (218-726-7174; fax: 218-726-7008)
Email: thughes@d.umn.edu
Website: http://www.d.umn.edu/cehsp/gradprograms/sped/index

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 31
- This program requires summer semesters for timely completion.
- Degree: Master of Special Education

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

This program is designed for P-12 special education teachers or people preparing for post-secondary teaching careers, and aligned with the Council for Exceptional Children (CEC) Standards for Advanced Training of special educators, which advocates the importance of commitment to learners and their learning, pedagogy, assessing and monitoring student learning, leadership, reflective practice, and participation in professional learning communities.

Summer coursework together with academic year projects allow participants to live in rural Minnesota and surrounding states and to continue full-time employment while completing their degrees.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants should have an undergraduate degree in a field related to special education.

Submit the following as part of the application:
- Application form
- $30 non-refundable application fee
- Official transcripts from the institution granting the bachelor's degree. Transcripts are considered official only if they are sent directly to the Collegiate Graduate Program Office from the undergraduate institution.
- Three letters of recommendation addressed to the Collegiate Graduate Programs Committee
- A one- to two-page paper describing professional goals and the importance of reflection in educational practice

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

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Information current as of October 02, 2012
Program Requirements

Plan C: Plan C requires 31 major credits and null credits outside the major. There is no final exam. A capstone project is required.

Capstone Project: After presenting an approved project proposal, students enroll in 6 credits of EHS 5990. Possible projects include a research report (thesis), a curriculum, or a literature review.

This program may not be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 1 semester must be completed before filing a Degree Program Form.

Required Coursework

- SPED 7800 - Special Education Law (3.0 cr)
- SPED 7100 - Professional Issues in Special Education (3.0 cr)
- SPED 7200 - Advanced Behavior Management Principles and Practices (3.0 cr)
- SPED 7710 - Practice, Research, and Leadership I (3.0 cr)
- SPED 7912 - Special Education Administration and Supervision (3.0 cr)
- SPED 7720 - Practice, Research, and Leadership II (3.0 cr)
- SPED 7730 - Practice, Research, and Leadership III (3.0 cr)
- EDUC 7XXX - Advanced Statistics
- SPED 7004 - Research Methods in Education
- SPED 7444 - Principles of Program Evaluation in Educational Settings
**Duluth Campus**

**Teaching and Learning Ed.D.**

**Education**

**College of Education and Human Service Professions**

Link to a list of faculty for this program.

**Contact Information:**

Department of Education, 412 Library Drive, 150 EduE, Duluth, MN 55812 (218-726-6525; fax: 218-726-7008)


- Program Type: Doctorate
- Requirements for this program are current for Fall 2011
- Length of program in credits: 76
- This program requires summer semesters for timely completion.
- Degree: Doctor of Education

Along with the program-specific requirements listed below, please read the [General Information](http://www.d.umn.edu/educ/programs/edd/index.html) section of the catalog website for requirements that apply to all major fields.

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.

**Program Delivery**

This program is available:
- partially online (between 50% to 80% of instruction is online)

**Prerequisites for Admission**

The preferred undergraduate GPA for admittance to the program is 3.00.

A master's or comparable foreign degree in education or a related field (special education, curriculum and instruction, human development, psychology, social work, management science, criminology)

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), a personal statement of career objectives, and a personal interview with the Ed.D. teaching and learning admissions committee. 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.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 500
  - General Test - Quantitative Reasoning: 500

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550

The preferred English language test is Test of English as Foreign Language.
Key to test abbreviations (GRE, TOEFL).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
37 credits are required in the major.
15 credits are required outside the major.
24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 4 semesters must be completed before filing a Degree Program Form.

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.

Required Coursework
EDUC 8015 - Research Design (3.0 cr)
EDUC 8016 - Theory and Practice of Qualitative Research Methods (3.0 cr)
EDUC 8017 - Theory and Practice of Quantitative Research Methods (3.0 cr)
EDUC 8018 - Statistical Analysis in Educational Research (3.0 cr)
EDUC 8020 - Doctoral Seminar (1.0 cr)
EDUC 8001 - Historical, Social, and Philosophical Foundations of Education (3.0 cr)
EDUC 8003 - Educational Policy (3.0 cr)
EDUC 8005 - Curriculum: Theory into Practice (3.0 cr)
EDUC 8007 - Research on Knowledge and Learning in Education (3.0 cr)
EDUC 7005 - Teaching and Learning in a Systems Context (3.0 cr)
EDUC 8009 - Distance Education: From Theory to Practice (3.0 cr)
EDUC 8021 - Theories, Principles, and Methodology of Assessment in Organizational Systems (3.0 cr)
EDUC 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)
**Duluth Campus**  
**Toxicology M.S.**  
*Duluth School of Medicine - Adm*  
*Medical School - Duluth Campus*

Link to a list of faculty for this program.

**Contact Information:**  
Toxicology Graduate Program, Medical School Duluth, 162 SMed, 1035 University Drive, Duluth, MN 55812 (218-726-6354; fax: 218-726-8014)  
Email: toxgrad@d.umn.edu  
Website: [http://www.ahc.umn.edu/toxicology](http://www.ahc.umn.edu/toxicology)

- Program Type: Master's  
- Requirements for this program are current for Fall 2011  
- Length of program in credits: 36 to 38  
- This program requires summer semesters for timely completion.  
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the [General Information](#) section of the catalog website for requirements that apply to all major fields.

This University-wide program provides comprehensive training in the broad scope of toxicology. Toxicology, the science of poisons, is devoted to identifying and quantifying potential noxious agents in our environment. Although most chemical agents at sufficiently large doses may be toxic, not all present a significant risk to human health or to environmental organisms or ecosystems. Accordingly, the essence of the science of toxicology is defining the fine line that distinguishes a risk from a residue. To accomplish this requires scientific expertise in such areas as analytical and environmental chemistry, biology, and mathematics. Advanced courses and research are also available in such subdisciplines as human health risk assessment, epidemiology, environmental chemistry and engineering ecotoxicology, food additives and nutritional toxicology, biochemical and physiological mechanisms, histopathology, diagnostic and analytical toxicology, drug metabolism, chemical carcinogenesis, behavioral toxicology, and the toxicity of noxious agents to various organ systems (e.g., nervous, heart, liver, kidneys).

**Program Delivery**  
This program is available:  
- via classroom (the majority of instruction is face-to-face)

**Prerequisites for Admission**  
The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree or its foreign equivalent from a recognized college or university; at least a full year each of biology, organic chemistry, and physics; as well as mathematics are required.

Applicants must submit their test score(s) from the following:  
- GRE

International applicants must submit score(s) from one of the following tests:  
- TOEFL  
  - Internet Based - Total Score: 79  
  - Internet Based - Writing Score: 21  
  - Internet Based - Reading Score: 19  
  - Paper Based - Total Score: 550  
- IELTS  
  - Total Score: 6.5  

The preferred English language test is Test of English as Foreign Language

Key to test abbreviations (GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the [General Information](#) section of the catalog website.
Program Requirements

Plan A: Plan A requires 22 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 30 major credits and 6 credits outside the major. The final exam is oral.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The master of science degree is offered under Plan A and Plan B. Plan A requires 22 course credits and 10 thesis credits; Plan B requires 30 course credits. A core curriculum of 8 credits in toxicology (TXCL 8012, 8013, and 8100) is required for both plans. Additional courses are arranged on an individual basis.

Required Coursework

- TXCL 8012 - Advanced Toxicology I (3.0 cr)
- TXCL 8013 - Advanced Toxicology II (3.0 cr)
- TXCL 8100 - Investigative Toxicology (1.0 cr)
Duluth Campus

Toxicology Minor

Duluth School of Medicine - Adm
Medical School - Duluth Campus

Link to a list of faculty for this program.

Contact Information:

Toxicology Graduate Program, Medical School Duluth, 162 SMed, 1035 University Drive, Duluth, MN 55812 (218-726-6354; fax: 218-726-8014)

Email: toxgrad@d.umn.edu
Website: http://www.ahc.umn.edu/toxicology

• Program Type: Graduate minor related to major
• Requirements for this program are current for Fall 2011
• Length of program in credits (Masters): 12
• Length of program in credits (Doctorate): 12
• This program requires summer semesters for timely completion.

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

This University-wide program provides comprehensive training in the broad scope of toxicology. Toxicology, the science of poisons, is devoted to identifying and quantifying potential noxious agents in our environment. Although most chemical agents at sufficiently large doses may be toxic, not all present a significant risk to human health or to environmental organisms or ecosystems. Accordingly, the essence of the science of toxicology is defining the fine line that distinguishes a risk from a residue. To accomplish this requires scientific expertise in such areas as analytical and environmental chemistry, biology, and mathematics. Advanced courses and research are also available in such subdisciplines as human health risk assessment, epidemiology, environmental chemistry and engineering, ecotoxicology, food additives and nutritional toxicology, biochemical and physiological mechanisms, histopathology, diagnostic and analytical toxicology, drug metabolism, chemical carcinogenesis, behavioral toxicology, and the toxicity of noxious agents to various organ systems (e.g., nervous, heart, liver, kidneys).

Program Delivery

This program is available:
• via classroom (the majority of instruction is face-to-face)

Program Requirements

Use of 4xxx courses towards program requirements is not permitted.

A minor is available at the doctoral level and requires 12 credits--8 credits of core courses and 4 credits of advanced toxicology courses.
Duluth Campus

Toxicology Ph.D.

Duluth School of Medicine - Adm
Medical School - Duluth Campus

Link to a list of faculty for this program.

Contact Information:
Toxicology Graduate Program, Medical School Duluth, 162 SMed, 1035 University Drive, Duluth, MN 55812 (218-726-6354; fax: 218-726-8014)
Email: toxgrad@d.umn.edu
Website: http://www.ahc.umn.edu/toxicology

- Program Type: Doctorate
- Requirements for this program are current for Fall 2011
- Length of program in credits: 58
- This program requires summer semesters for timely completion.
- The Toxicology Ph.D. is an All-University program delivered on the Twin Cities and Duluth Campuses. The University of Minnesota Twin Cities is the degree granting authority for the Toxicology Ph.D. program in Duluth.
- Degree: Doctor of Philosophy

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

This University-wide program provides comprehensive training in the broad scope of toxicology. Toxicology, the science of poisons, is devoted to identifying and quantifying potential noxious agents in our environment. Although most chemical agents at sufficiently large doses may be toxic, not all present a significant risk to human health or to environmental organisms or ecosystems. Accordingly, the essence of the science of toxicology is defining the fine line that distinguishes a risk from a residue. To accomplish this requires scientific expertise in such areas as analytical and environmental chemistry, biology, and mathematics. Advanced courses and research are also available in such subdisciplines as human health risk assessment, epidemiology, environmental chemistry and engineering, ecotoxicology, food additives and nutritional toxicology, biochemical and physiological mechanisms, histopathology, diagnostic and analytical toxicology, drug metabolism, chemical carcinogenesis, behavioral toxicology, and the toxicity of noxious agents to various organ systems (e.g., nervous, heart, liver, kidneys).

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

Applicants must have a bachelor's degree or its foreign equivalent from a recognized college or university.

At least a full year each of biology, organic chemistry, and physics as well as mathematics through calculus are expected.

Applicants must submit their test score(s) from the following:
- GRE

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
The preferred English language test is Test of English as Foreign Language

Key to test abbreviations (GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

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Information current as of October 02, 2012
Program Requirements
22 credits are required in the major.
12 credits are required outside the major.
24 thesis credits are required.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

The doctor of philosophy degree requires core courses in physiology (4 credits), biochemistry (6 credits), statistics (2 credits), and toxicology (10 credits). Students must also complete 12 credits in a minor or supporting program and 24 thesis credits. Because the program spans the Duluth and Twin Cities campuses, the required courses differ on each campus.

Additional advanced courses in toxicology or related fields may be specified by the adviser. Students must complete and defend an original research project.
Duluth Campus
Tribal Administration and Governance M.T.A.G.
American Indian Studies
College of Liberal Arts

Link to a list of faculty for this program.

Contact Information:
Department of American Indian Studies, University of Minnesota Duluth, Cina Hall 116, 1123 University Drive, Duluth, MN 55812 (218-726-7332)
Email: amid@d.umn.edu
Website: http://www.d.umn.edu/cla/mtag/main/index.php

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 34
- This program does not require summer semesters for timely completion.
- Degree: Master of Tribal Admin and Governance

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

The master of tribal administration and governance (M.T.A.G.) is an applied professional development degree designed to develop the knowledge and skills needed to work as an administrator in a tribal government. Students in the program may already serve as tribal administrators, council members, or tribal leaders. Students who currently work or aspire to work professionally in tribal governments or management positions will benefit from this program, which emphasizes both the acquisition of academic knowledge and the application of practical skills.

The curriculum is based on the roles that tribal administrators, leaders, and professionals play in formal and informal situations that support tribal sovereignty and self-determination. Traditional language and culture is an important thread throughout the program. Program delivery is designed to accommodate working professionals and support existing commitments to families and home communities. A combination of online delivery and several weekend meetings per semester provides face-to-face interaction with experts in each area of the curriculum including faculty, staff, special guests, and students.

Program Delivery
This program is available:
- partially online (between 50% to 80% of instruction is online)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

A bachelor's degree is required.

Special Application Requirements:
Applications are accepted for fall entry on a rolling basis. Unofficial transcripts or academic records, two letters of recommendation, and a personal statement must be uploaded directly to the online application. The personal statement should include what the student intends to get out of the M.T.A.G. program and accomplish in tribal administration and governance. Official transcripts or academic records will be required only if the applicant is admitted to the program.

International applicants must submit score(s) from one of the following tests:
- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations (TOEFL, IELTS, MELAB).
For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

**Plan C:** Plan C requires 34 major credits and null credits outside the major. There is no final exam.

This program may not be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

**Semester One (Fall, Year One)**
- MTAG 5110 - Principles of Tribal Sovereignty I (3.0 cr)
- MTAG 5210 - Administration Governance I (Strategic) (3.0 cr)
- MTAG 5310 - Foundations of Leadership and Ethics in Indigenous Community Life and Organizations (3.0 cr)

**Semester Two (Spring, Year One)**
- MTAG 5120 - Principles of Tribal Sovereignty II (3.0 cr)
- MTAG 5220 - Administration and Governance II (Operations) (3.0 cr)
- MTAG 5320 - Applied Leadership and Ethics in an Indigenous Organizational Context (3.0 cr)

**Summer**
- MTAG 5997 - Tribal Administration and Governance Directed Project (2.0 cr)

**Semester Three (Fall, Year Two)**
- MTAG 5230 - Advanced Tribal Administration and Governance I (Human Resources) (3.0 cr)
- MTAG 5430 - Tribal Finance, Accounting and Budgets I (3.0 cr)
- MTAG 5530 - Federal Indian Law I (3.0 cr)

**Semester Four (Spring, Year Two)**
- MTAG 5240 - Advanced Tribal Administration and Governance II (Project) (3.0 cr)
- MTAG 5440 - Tribal Finance, Accounting and Budgets II (3.0 cr)
- MTAG 5540 - Federal Indian Law II (3.0 cr)
Duluth Campus

Water Resources Science M.S.
Swenson College of Science & Engineering
University of Minnesota Duluth

Link to a list of faculty for this program.

Contact Information:
Water Resources Science, University of Minnesota, 173 McNeal Hall, 1985 Buford Avenue, St. Paul MN 55108 (612-624-7456; fax: 612-625-1263)
Email: wrs@umn.edu
Website: http://wrs.umn.edu

- Program Type: Master's
- Requirements for this program are current for Fall 2011
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- University of Minnesota, Twin Cities
- Degree: Master of Science

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

This cross-campus interdisciplinary program provides comprehensive training in water resources science, with integration across scientific disciplines. A structured interdisciplinary graduate curriculum is offered. The program includes a set of core courses plus electives in the following areas of emphasis at the M.S. level: aquatic biology, environmental chemistry, hydrologic science, limnology, water management technology, water policy, water quality, and watershed science and management. Approximately 80 courses offered within 15 other graduate programs are available to students majoring in water resources science.

The goal of the program is to produce scientists with strong technical skills in disciplines relevant to water resources and a broad understanding of 1) the hydrologic cycle and associated ecosystems, 2) the interconnectedness of the sciences involved in managing aquatic resources, and 3) the interplay between the biophysical sciences and social sciences in developing and implementing public policies related to water.

Students in the program develop the breadth of scientific knowledge appropriate to understand the complicated aquatic ecosystems and watersheds on which they will work, as well as social dimensions of the topic, including the public policy and legal frameworks in which water resources are protected and managed.

The program involves faculty from the following departments on the Twin Cities campus: Applied Economics; Bioproducts and Biosystems Engineering; Civil Engineering; Earth Sciences; Ecology, Evolution, and Behavior; Entomology; Environmental and Occupational Health; Fisheries, Wildlife, and Conservation Biology; Forest Resources; Geography; Horticultural Science; Microbiology, Plant Biology; Soil, Water, and Climate; and the Humphrey Institute of Public Affairs. It also involves faculty from the following departments on the Duluth campus: Biology; Chemical Engineering; Chemistry; Civil Engineering; Geography; Geological Sciences; Physics; and Political Science; as well as the Large Lakes Observatory and the Natural Resources Research Institute in Duluth.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

The program is flexible enough to accommodate students from a variety of backgrounds. Normally students have a bachelor's degree in physical or biological science or engineering.

Recommended academic preparation includes one year (or two semesters) each of calculus, physics, and chemistry, and one biology course.

Availability of funding and willingness of a member of the graduate faculty to serve as an adviser are important criteria for admission to the program.
Special Application Requirements:
Applicants must submit three letters of recommendation via the Graduate School ApplyYourself website. These letters should be from professors qualified to estimate applicant's class rank and evaluate their ability to complete a program of graduate study, or from persons who can assess their professional or research potential.

Applicants must also submit a résumé of their academic history and professional experience and a statement of purpose, including the proposed area of emphasis. Applicants should submit results of the GRE General Test. Students may be admitted any semester but are strongly encouraged to submit their application by December 15 for fall semester admission. More specific application instruction can be found on the program website: wrs.umn.edu/prospectivestudents/apply/index.htm.

Applicants must submit their test score(s) from the following:
• GRE

International applicants must submit score(s) from one of the following tests:
• TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
• IELTS
  - Total Score: 6.5
• MELAB
  - Final score: 80
The preferred English language test is Test of English as Foreign Language

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
Plan A: Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 14 major credits and 6 credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: The Plan B project is defined by the faculty adviser. The Plan B option is well suited to students who have little undergraduate coursework in water resources science and thus need more coursework to gain the combination of depth and breadth needed in this field. Plan B projects involve field, laboratory, or computer work and the analysis, synthesis, or interpretation of data.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

Students may choose Plan A, which requires a thesis, or Plan B, which requires additional coursework and a major project. Both plans incorporate courses offered on the Twin Cities and Duluth campuses.

Students must complete courses in four core areas: 1) hydrology (surface and/or hydrogeology); 2) environmental/water chemistry; 3) limnology; and 4) water resources policy, economics, and management, and two electives in such areas of emphasis as aquatic biology, hydrologic science, watershed science and management, and water management technology. One elective must be from an approved list of technical courses dealing with water quality science/management. A minimum of two related field courses (at least 6 credits) outside of aquatic science are required. Registration for the WRS Seminar during the first semester in residence and training in responsible conduct of research and ethics are also required.

Approved core and area of emphasis courses as well as a list of faculty are listed on the program website: wrs.umn.edu/degreesandcourses/index.htm.

Program Sub-plans
A sub-plan is not required for this program. Students may not complete the program with more than one sub-plan.

**Limnology and Oceanography**

The science of inland waters, or "limnology," includes the study of streams, lakes, ponds, and wetlands. While Lake Superior falls into this category, the style of research, particularly the nature of sampling and the scale of the processes investigated, makes study of Lake Superior and other Great Lakes more akin to oceanography than to classical limnology. A program that focuses on the study of both limnology and oceanography strengthens understanding of both systems, through comparative studies and by fostering interaction between groups that focus more strongly on one or the other system. Limnology and oceanography are by necessity interdisciplinary fields, with major components contributed by biological, geological, physical, and chemical sciences. Such interdisciplinary fields in the modern research university require mechanisms to insure cross-fertilization of ideas, approaches, methods, techniques, and knowledge. The limnology and oceanography track in WRS provides just such a much-needed mechanism.

The goal of the program is to produce scientists with strong technical skills in aquatic science and a broad understanding of limnology and oceanography.

Students may choose Plan A, which requires a thesis, or Plan B, which requires additional coursework and a major project. Specific curriculum for the limnology and oceanography track follows WRS course requirements. Both plans incorporate courses offered on the Twin Cities and Duluth campuses.

Students must complete courses in four limnology and oceanography track core areas: 1) hydrology (surface and/or hydrogeology); 2) environmental/water chemistry; 3) limnology; and 4) water resources policy, economics, and management; and one elective must be from an approved list of technical courses dealing with water quality science/management. An additional one or two electives in limnology and oceanography are also required. A minimum of two related field courses (at least 6 credits) outside of aquatic science are required. Registration for the WRS Seminar during the first semester in residence and training in responsible conduct of research and ethics are also required.

A minimum of 20 course credits (plus 10 thesis credits) are required for Plan A and a minimum of 30 credits are required for Plan B (up to 3 credits may be used for the Plan B project). Students who had classes equivalent to those in the WRS core as undergraduates may substitute other classes to meet minimum credit requirements.

The faculty adviser must be a member of the limnology and oceanography track faculty.

Approved limnology and oceanography track core and elective courses as well as a list of faculty are listed on the program website: [wrs.umn.edu/degreesandcourses/landotrack/index.htm](http://wrs.umn.edu/degreesandcourses/landotrack/index.htm).
**Duluth Campus**  
**Water Resources Science Minor**  
_Swenson College of Science & Engineering_  
_Untiversity of Minnesota Duluth_

Link to a list of faculty for this program.

**Contact Information:**  
Water Resources Science, 173 McNeal Hall, 1985 Buford Avenue, St. Paul MN 55108 (612-624-7456; fax: 612-625-1263)  
Email: wrs@umn.edu  
Website: [http://wrs.umn.edu](http://wrs.umn.edu)

- Program Type: Graduate minor related to major  
- Requirements for this program are current for Fall 2011  
- Length of program in credits (Masters): 9  
- Length of program in credits (Doctorate): 12  
- This program does not require summer semesters for timely completion.

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

This cross-campus interdisciplinary program provides comprehensive training in water resources science, with integration across scientific disciplines. A structured interdisciplinary graduate curriculum is offered. The program includes a set of core courses plus electives in the following areas of emphasis at the M.S. and Ph.D. levels: aquatic biology, environmental chemistry, hydrologic science, limnology, water management technology, water policy, water quality, and watershed science and management. Approximately 80 courses offered within 15 other graduate programs are available to students majoring in water resources science.

The goal of the program is to produce scientists with strong technical skills in disciplines relevant to water resources and a broad understanding of 1) the hydrologic cycle and associated ecosystems, 2) the interconnectedness of the sciences involved in managing aquatic resources, and 3) the interplay between the biophysical sciences and social sciences in developing and implementing public policies related to water.

Students in the program develop the breadth of scientific knowledge appropriate to understand the complicated aquatic ecosystems and watersheds on which they will work, as well as social dimensions of the topic, including the public policy and legal frameworks in which water resources are protected and managed.

The program involves faculty from the following departments on the Twin Cities campus: Applied Economics; Bioproducts and Biosystems Engineering; Civil Engineering; Earth Sciences; Ecology, Evolution, and Behavior; Entomology; Environmental and Occupational Health; Fisheries, Wildlife, and Conservation Biology; Forest Resources; Geography; Horticultural Science; Microbiology, Plant Biology; Soil, Water, and Climate; and the Humphrey Institute of Public Affairs. It also involves faculty from the following departments on the Duluth campus: Biology; Chemical Engineering; Chemistry; Civil Engineering; Geography; Geological Sciences; Physics; and Political Science; as well as the Large Lakes Observatory and the Natural Resources Research Institute in Duluth.

**Program Delivery**  
This program is available:  
- via classroom (the majority of instruction is face-to-face)

**Program Requirements**  
Use of 4xxx courses towards program requirements is not permitted.

A master's minor requires 9 credits, including WRS 5101 (3 credits) and two of the other core courses described under M.S. degree requirements. Doctoral students must complete 12 credits, including WRS 5101 (3 credits), a core courses described under the M.S. degree requirements, and two electives from one of the areas of emphasis.
Duluth Campus

Water Resources Science Ph.D.
Swenson College of Science & Engineering
University of Minnesota Duluth

Link to a list of faculty for this program.

Contact Information:
Water Resources Science, 173 McNeal Hall, 1985 Buford Avenue, St. Paul MN 55108 (612-624-7456; fax: 612-625-1263)
Email: wrs@umn.edu
Website: http://wrs.umn.edu

- Program Type: Doctorate
- Requirements for this program are current for Fall 2011
- Length of program in credits: 64
- This program does not require summer semesters for timely completion.
- The Water Resource Science Ph.D. is an All-University program delivered on the Twin Cities and Duluth Campuses. The University of Minnesota Twin Cities is the degree granting authority for the Water Resources Science Ph.D. program in Duluth.
- Degree: Doctor of Philosophy

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

This cross-campus interdisciplinary program provides comprehensive training in water resources science, with integration across scientific disciplines. A structured interdisciplinary graduate curriculum is offered. The program includes a set of core courses plus electives in the following areas of emphasis at the Ph.D. level: aquatic biology, environmental chemistry, hydrologic science, limnology, water management technology, water policy, water quality, and watershed science and management. Approximately 80 courses offered within 15 other graduate programs are available to students majoring in water resources science.

The goal of the program is to produce scientists with strong technical skills in disciplines relevant to water resources and a broad understanding of 1) the hydrologic cycle and associated ecosystems, 2) the interconnectedness of the sciences involved in managing aquatic resources, and 3) the interplay between the biophysical sciences and social sciences in developing and implementing public policies related to water.

Students in the program develop the breadth of scientific knowledge appropriate to understand the complicated aquatic ecosystems and watersheds on which they will work, as well as social dimensions of the topic, including the public policy and legal frameworks in which water resources are protected and managed.

The program involves faculty from the following departments on the Twin Cities campus: Applied Economics; Bioproducts and Biosystems Engineering; Civil Engineering; Earth Sciences; Ecology, Evolution, and Behavior; Entomology; Environmental and Occupational Health; Fisheries, Wildlife, and Conservation Biology; Forest Resources; Geography; Horticultural Science; Microbiology, Plant Biology; Soil, Water, and Climate; and the Humphrey Institute of Public Affairs. It also involves faculty from the following departments on the Duluth campus: Biology; Chemical Engineering; Chemistry; Civil Engineering Geography; Geological Sciences; Physics; Political Science; as well as the Large Lakes Observatory and the Natural Resources Research Institute in Duluth.

Program Delivery
This program is available:
- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission
The preferred undergraduate GPA for admittance to the program is 3.00.

The program is flexible enough to accommodate students from a variety of backgrounds. Normally students have a bachelor's or master's degree in physical or biological science or engineering.

Recommended academic preparation includes one year (or two semesters) each of calculus, physics, and chemistry, and one biology course at the undergraduate level.

Availability of funding and willingness of a member of the graduate faculty to serve as an adviser are important criteria for admission to the Ph.D. program.
Special Application Requirements:
Applicants must submit three letters of recommendation via the Graduate School ApplyYourself website. These letters should be from professors qualified to estimate applicant's class rank and evaluate their ability to complete a program of graduate study, or from persons who can assess their professional or research potential.

Applicants must also submit a résumé of their academic history and professional experience and a statement of purpose, including the proposed area of emphasis. Applicants should submit results of the GRE. Students may be admitted any semester but are strongly encouraged to submit their application by December 15 for fall semester admission. More specific application instruction can be found on the program website: wrs.umn.edu/prospectivestudents/apply/index.htm.

Applicants must submit their test score(s) from the following:
• GRE

International applicants must submit score(s) from one of the following tests:
• TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
• IELTS
  - Total Score: 6.5
• MELAB
  - Final score: 80

Key to test abbreviations (GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements
28 credits are required in the major.
12 credits are required outside the major.
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Coursework is tailored to student interests, and many areas of emphasis are possible. Core courses are offered on both the Twin Cities and Duluth campuses.

Students complete coursework equivalent to that of an M.S. in water resources science, with additional coursework in an area of emphasis. There are no specific credit requirements in the major, but Ph.D. programs normally include at least 40 course credits beyond the B.S. level, including relevant coursework taken for a master's degree and a required minimum of 12 credits in a supporting or minor program.

Approved core and area of emphasis courses as well as a list of faculty are listed on the program website: wrs.umn.edu/degreesandcourses/index.htm.

Program Sub-plans
A sub-plan is not required for this program.
Students may not complete the program with more than one sub-plan.

Limnology and Oceanography
The science of inland waters, or "limnology," includes the study of streams, lakes, ponds, and wetlands. While Lake Superior falls into this category, the style of research, particularly the nature of sampling and the scale of the processes investigated, makes study of Lake Superior and other Great Lakes more akin to oceanography than to classical limnology. A program that focuses on the study of both...
limnology and oceanography strengthens understanding of both systems, through comparative studies and by fostering interaction between groups that focus more strongly on one or the other system. Limnology and oceanography are by necessity interdisciplinary fields, with major components contributed by biological, geological, physical, and chemical sciences.

This track within the cross-campus interdisciplinary WRS program provides comprehensive training in limnology and oceanography. As is the case for the WRS graduate program as a whole, the limnology and oceanography program includes a set of core courses plus electives in the subfield of limnology and oceanography.

The goal of the program is to produce scientists with strong technical skills in aquatic science and a broad understanding of limnology and oceanography. Faculty on both Twin Cities and Duluth campuses participate in the limnology and oceanography track. WRS limnology and oceanography faculty list: http://wrs.umn.edu/faculty/landotracklist/index.htm.

Specific to this sub-plan:
Specific curriculum for the limnology and oceanography track follows WRS course requirements. Core courses are offered on both the Twin Cities and Duluth campuses.

Ph.D. students pursuing this track must have at least two members of the limnology and oceanography track faculty on their committee including the adviser.

Approved limnology and oceanography track core and elective courses as well as a list of faculty are listed on the program website: wrs.umn.edu/degreesandcourses/landotrack/index.htm.