



UNIVERSITY OF MINNESOTA
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University of Minnesota Duluth 2020-2022 Graduate Programs

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For current information, refer to:

- Program search: z.umn.edu/publicprogramsearch
- Course search: z.umn.edu/publiccoursecatalog
- University policies: policy.umn.edu

University of Minnesota Duluth
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*Indicates a free-standing minor

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Duluth Campus

American Indian Studies Minor

American Indian Studies

College of Liberal Arts

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

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- 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.

The American Indian studies minor provides an introduction to tribal sovereignty, indigenous cultures, and the historical and contemporary experience of Native peoples and nations.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

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.

Required Course (3 credits)

All students must take at least 3 credits of the following:

[AMIN 8593](#) - Directed Study (1.0 - 6.0 cr)

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.

Masters

Electives (6 credits)

Take 2 or more courses totaling 6 or more credits from the following to complete the 9-credit minimum for the masters minor.

AMIN 4xxx

AMIN 5xxx

AMIN 8xxx

MTAG 5xxx

Doctoral

Electives (9 credits)

Take 3 or more courses totaling 9 or more credits from the following to complete the 12-credit minimum for the doctoral minor:

AMIN 4xxx

AMIN 5xxx

AMIN 8xxx

MTAG 5xxx



Duluth Campus
English M.A.
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: enql@d.umn.edu

Website: <http://www.d.umn.edu/enql/englishgrad/index.html>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32
- 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 offers five emphases: Literary Studies, for concentrated study of literature; Literature, Language, and Culture for interdisciplinary study; Publishing and Print culture; Writing Studies; and Creative Writing.

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 or a related humanities field.

Other requirements to be completed before admission:

Entering students should have completed 30 credits in English (these may include credits in literature, language, advanced composition and other humanities fields), including 20 upper-division English courses that offer broad coverage of English and American literature. Any deficiencies will be determined and considered 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.

Special Application Requirements:

GRE scores are on Verbal and Analytical Writing portions.

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: 100
 - Internet Based - Writing Score: 21
 - Internet Based - Reading Score: 19
- 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 26 major credits and 0 to 6 credits outside the major. The final exam is written and oral. A capstone project is required.

Capstone Project: This degree requires two Plan B 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: Proficiency in an approved language.

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

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

1. Requires certification of a reading knowledge appropriate to the candidate's area of study, of Latin, Greek, French, Italian, Spanish, Russian, American Sign Language, or other approved language by the Graduate Education Committee or completion of at least 6 course credits beyond the required credits.
2. A minimum of two 8xxx level courses **MUST** be taken in addition to ENGL 8906. ENGL 8902 does not count towards this requirement except in the Writing Studies emphasis.
3. Courses at the 4000-level in English, writing studies and linguistics may not be included in degree in English.
4. Some 4xxx courses are permitted in the related field.

Required Seminar (4 cr)

[ENGL 8906](#) - Introduction to Critical Theory (4.0 cr)

Emphases Options

Literature, Language & Culture

At least 25 credits in the major, distributed in literature, linguistics, information design, or composition/rhetoric; and 2 Plan B projects.

Required English, Linguistics, and Writing Studies Courses

Take 20 or more credit(s) from the following:

- [ENGL 5116](#) - Advanced Writing of Fiction (4.0 cr)
- [ENGL 5122](#) - Advanced Writing of Poetry (4.0 cr)
- [ENGL 5222](#) - Shakespeare (4.0 cr)
- [ENGL 5270](#) - Digital Literature, Video Games and Online Culture (4.0 cr)
- [ENGL 5312](#) - Chaucer (4.0 cr)
- [ENGL 5375](#) - Modern Poetry (4.0 cr)
- [ENGL 5444](#) - Childhood in Literature, History and Culture (4.0 cr)
- [ENGL 5541](#) - Restoration and 18th-Century Literature (4.0 cr)
- [ENGL 5562](#) - Studies in 19th-Century British Literature (4.0 cr)
- [ENGL 5572](#) - American Renaissance (4.0 cr)
- [ENGL 5574](#) - Studies in American Literature to 1914 (4.0 cr)
- [ENGL 5575](#) - Studies in American Literature after 1914 (4.0 cr)
- [ENGL 5577](#) - Major American Authors (4.0 cr)
- [ENGL 5584](#) - Mapping Postcolonial Literature (4.0 cr)
- [ENGL 5591](#) - Independent Study (1.0 - 4.0 cr)
- [ENGL 5595](#) - Special Topics: (Various Titles to be Assigned) (4.0 cr)
- [ENGL 5661](#) - Publishing the Middle Ages (4.0 cr)
- [ENGL 5662](#) - The Making of a Major Author: The Scholarly Edition in 17th- and 18th-Century England (4.0 cr)
- [ENGL 5663](#) - Readers and the History of Books (4.0 cr)
- [ENGL 5665](#) - The American Literary Marketplace (4.0 cr)
- [ENGL 5802](#) - English Language for Educators (4.0 cr)

- ENGL 5821 - History of the English Language (4.0 cr)
- ENGL 5902 - Teaching Writing (4.0 cr)
- ENGL 8171 - Seminar in Pre-1800 British Literature (4.0 cr)
- ENGL 8181 - Seminar in British Literature, Late 18th - 20th Century (4.0 cr)
- ENGL 8191 - Seminar: American Literature (4.0 cr)
- ENGL 8906 - Introduction to Critical Theory (4.0 cr)
- ENGL 8931 - Practicum in Teaching Literature (1.0 - 4.0 cr)
- LING 8591 - Independent Study in Linguistics (1.0 - 3.0 cr)
- WRIT 5197 - Internship in Writing (1.0 - 3.0 cr)
- WRIT 5230 - Web Design and Digital Culture (3.0 cr)
- WRIT 5250 - New Media Writing (3.0 cr)
- WRIT 5260 - Visual Rhetoric and Culture (3.0 cr)
- WRIT 8994 - Directed Research in Writing Studies (1.0 - 3.0 cr)

Plan B Project

Take exactly 2 credit(s) from the following:

- ENGL 8094 - Plan B Research (DRS) (1.0 cr)
- WRIT 8094 - Plan B Research (DRS) (1.0 cr)

Related Field

In order to reach the minimum 32 credits, course(s) may be from ENGL coursework, another graduate program or approved language course(s). Credits in a related field are determined in consultation with the director of graduate studies.

-OR-

Literary Studies

At least 26 credits in the major and 2 Plan B projects.

Required English, Linguistics, and Writing Studies Courses

Take 20 - 26 credit(s) from the following:

- ENGL 5116 - Advanced Writing of Fiction (4.0 cr)
- ENGL 5122 - Advanced Writing of Poetry (4.0 cr)
- ENGL 5222 - Shakespeare (4.0 cr)
- ENGL 5270 - Digital Literature, Video Games and Online Culture (4.0 cr)
- ENGL 5312 - Chaucer (4.0 cr)
- ENGL 5375 - Modern Poetry (4.0 cr)
- ENGL 5444 - Childhood in Literature, History and Culture (4.0 cr)
- ENGL 5541 - Restoration and 18th-Century Literature (4.0 cr)
- ENGL 5562 - Studies in 19th-Century British Literature (4.0 cr)
- ENGL 5572 - American Renaissance (4.0 cr)
- ENGL 5574 - Studies in American Literature to 1914 (4.0 cr)
- ENGL 5575 - Studies in American Literature after 1914 (4.0 cr)
- ENGL 5577 - Major American Authors (4.0 cr)
- ENGL 5584 - Mapping Postcolonial Literature (4.0 cr)
- ENGL 5591 - Independent Study (1.0 - 4.0 cr)
- ENGL 5595 - Special Topics: (Various Titles to be Assigned) (4.0 cr)
- ENGL 5661 - Publishing the Middle Ages (4.0 cr)
- ENGL 5662 - The Making of a Major Author: The Scholarly Edition in 17th- and 18th-Century England (4.0 cr)
- ENGL 5663 - Readers and the History of Books (4.0 cr)
- ENGL 5665 - The American Literary Marketplace (4.0 cr)
- ENGL 5802 - English Language for Educators (4.0 cr)
- ENGL 5821 - History of the English Language (4.0 cr)
- ENGL 5902 - Teaching Writing (4.0 cr)
- ENGL 8171 - Seminar in Pre-1800 British Literature (4.0 cr)
- ENGL 8181 - Seminar in British Literature, Late 18th - 20th Century (4.0 cr)
- ENGL 8191 - Seminar: American Literature (4.0 cr)
- ENGL 8906 - Introduction to Critical Theory (4.0 cr)
- ENGL 8931 - Practicum in Teaching Literature (1.0 - 4.0 cr)

Plan B Project

Take exactly 2 credit(s) from the following:

- ENGL 8094 - Plan B Research (DRS) (1.0 cr)
- WRIT 8094 - Plan B Research (DRS) (1.0 cr)

Related Field

In order to reach the minimum 32 credits, course(s) may be from ENGL coursework, another graduate program or approved language course(s). Credits in a related field are determined in consultation with the director of graduate studies.

-OR-

Publishing & Print Culture

At least 27 credits within the major; distributed in literature, publishing information design, and print culture and 2 Plan B projects.

Students must have a minimum of 33 credits between ENGL courses and related field courses.

Required English, Linguistics, and Writing Studies Courses

Take 21 or more credit(s) from the following:

- ENGL 5116 - Advanced Writing of Fiction (4.0 cr)
- ENGL 5122 - Advanced Writing of Poetry (4.0 cr)
- ENGL 5222 - Shakespeare (4.0 cr)
- ENGL 5270 - Digital Literature, Video Games and Online Culture (4.0 cr)
- ENGL 5312 - Chaucer (4.0 cr)
- ENGL 5375 - Modern Poetry (4.0 cr)
- ENGL 5444 - Childhood in Literature, History and Culture (4.0 cr)
- ENGL 5541 - Restoration and 18th-Century Literature (4.0 cr)
- ENGL 5562 - Studies in 19th-Century British Literature (4.0 cr)
- ENGL 5572 - American Renaissance (4.0 cr)
- ENGL 5574 - Studies in American Literature to 1914 (4.0 cr)
- ENGL 5575 - Studies in American Literature after 1914 (4.0 cr)
- ENGL 5577 - Major American Authors (4.0 cr)
- ENGL 5584 - Mapping Postcolonial Literature (4.0 cr)
- ENGL 5591 - Independent Study (1.0 - 4.0 cr)
- ENGL 5595 - Special Topics: (Various Titles to be Assigned) (4.0 cr)
- ENGL 5661 - Publishing the Middle Ages (4.0 cr)
- ENGL 5662 - The Making of a Major Author: The Scholarly Edition in 17th- and 18th-Century England (4.0 cr)
- ENGL 5663 - Readers and the History of Books (4.0 cr)
- ENGL 5665 - The American Literary Marketplace (4.0 cr)
- ENGL 5802 - English Language for Educators (4.0 cr)
- ENGL 5821 - History of the English Language (4.0 cr)
- ENGL 5902 - Teaching Writing (4.0 cr)
- ENGL 8171 - Seminar in Pre-1800 British Literature (4.0 cr)
- ENGL 8181 - Seminar in British Literature, Late 18th - 20th Century (4.0 cr)
- ENGL 8191 - Seminar: American Literature (4.0 cr)
- ENGL 8906 - Introduction to Critical Theory (4.0 cr)
- ENGL 8931 - Practicum in Teaching Literature (1.0 - 4.0 cr)
- LING 8591 - Independent Study in Linguistics (1.0 - 3.0 cr)
- WRIT 5197 - Internship in Writing (1.0 - 3.0 cr)
- WRIT 5230 - Web Design and Digital Culture (3.0 cr)
- WRIT 5250 - New Media Writing (3.0 cr)
- WRIT 5260 - Visual Rhetoric and Culture (3.0 cr)
- WRIT 8994 - Directed Research in Writing Studies (1.0 - 3.0 cr)

Plan B Project

Take exactly 2 credit(s) from the following:

- ENGL 8094 - Plan B Research (DRS) (1.0 cr)
- WRIT 8094 - Plan B Research (DRS) (1.0 cr)

Related Field

In order to reach the minimum 33 credits, course(s) may be from ENGL coursework, another graduate program or approved language course(s). Credits in a related field are determined in consultation with the director of graduate studies.

-OR-

Writing Studies

At least 26 credits in the major, distributed in literature, linguistics, composition/rhetoric, information design and writing, and 2 Plan B projects.

Required English, Linguistics, and Writing Studies Courses

Take 24 or more credit(s) from the following:

- ENGL 5116 - Advanced Writing of Fiction (4.0 cr)
- ENGL 5122 - Advanced Writing of Poetry (4.0 cr)
- ENGL 5222 - Shakespeare (4.0 cr)
- ENGL 5270 - Digital Literature, Video Games and Online Culture (4.0 cr)
- ENGL 5312 - Chaucer (4.0 cr)
- ENGL 5375 - Modern Poetry (4.0 cr)
- ENGL 5444 - Childhood in Literature, History and Culture (4.0 cr)
- ENGL 5541 - Restoration and 18th-Century Literature (4.0 cr)
- ENGL 5562 - Studies in 19th-Century British Literature (4.0 cr)
- ENGL 5572 - American Renaissance (4.0 cr)
- ENGL 5574 - Studies in American Literature to 1914 (4.0 cr)
- ENGL 5575 - Studies in American Literature after 1914 (4.0 cr)
- ENGL 5577 - Major American Authors (4.0 cr)
- ENGL 5584 - Mapping Postcolonial Literature (4.0 cr)

- ENGL 5591 - Independent Study (1.0 - 4.0 cr)
- ENGL 5595 - Special Topics: (Various Titles to be Assigned) (4.0 cr)
- ENGL 5661 - Publishing the Middle Ages (4.0 cr)
- ENGL 5662 - The Making of a Major Author: The Scholarly Edition in 17th- and 18th-Century England (4.0 cr)
- ENGL 5663 - Readers and the History of Books (4.0 cr)
- ENGL 5665 - The American Literary Marketplace (4.0 cr)
- ENGL 5802 - English Language for Educators (4.0 cr)
- ENGL 5821 - History of the English Language (4.0 cr)
- ENGL 5902 - Teaching Writing (4.0 cr)
- ENGL 8171 - Seminar in Pre-1800 British Literature (4.0 cr)
- ENGL 8181 - Seminar in British Literature, Late 18th - 20th Century (4.0 cr)
- ENGL 8191 - Seminar: American Literature (4.0 cr)
- ENGL 8906 - Introduction to Critical Theory (4.0 cr)
- ENGL 8931 - Practicum in Teaching Literature (1.0 - 4.0 cr)
- LING 8591 - Independent Study in Linguistics (1.0 - 3.0 cr)
- WRIT 5197 - Internship in Writing (1.0 - 3.0 cr)
- WRIT 5230 - Web Design and Digital Culture (3.0 cr)
- WRIT 5250 - New Media Writing (3.0 cr)
- WRIT 5260 - Visual Rhetoric and Culture (3.0 cr)
- WRIT 8902 - Teaching College Writing (3.0 cr)
- WRIT 8910 - Practicum in Teaching Writing (1.0 - 4.0 cr)
- WRIT 8994 - Directed Research in Writing Studies (1.0 - 3.0 cr)

Plan B Project

Take 2 - 3 credit(s) from the following:

- ENGL 8094 - Plan B Research (DRS) (1.0 cr)
- WRIT 8094 - Plan B Research (DRS) (1.0 cr)

Related Field

In order to reach the minimum 32 credits, course(s) may be from ENGL coursework, another graduate program, or approved language course(s). Credits in a related field are determined in consultation with the director of graduate studies.

-OR-

Creative Writing

At least 26 credits in the major, distributed in writing and literature; and 2 Plan B projects.

Required English, Linguistics, and Writing Studies Courses

Take 20 or more credit(s) from the following:

Creative Writing

A course in related field as approved by advisor and DGS may be substituted.

Take 1 or more course(s) from the following:

- ENGL 5116 - Advanced Writing of Fiction (4.0 cr)
- ENGL 5122 - Advanced Writing of Poetry (4.0 cr)
- ENGL 5591 - Independent Study (1.0 - 4.0 cr)
- WRIT 5250 - New Media Writing (3.0 cr)

Literature and Context Courses

Take 3 or more course(s) from the following:

Contemporary Literatures

Take 1 or more course(s) from the following:

- ENGL 5270 - Digital Literature, Video Games and Online Culture (4.0 cr)
- ENGL 5375 - Modern Poetry (4.0 cr)
- ENGL 5444 - Childhood in Literature, History and Culture (4.0 cr)
- ENGL 5564 - Studies in British Literature after 1900 (4.0 cr)
- ENGL 5575 - Studies in American Literature after 1914 (4.0 cr)
- ENGL 5577 - Major American Authors (4.0 cr)
- ENGL 5584 - Mapping Postcolonial Literature (4.0 cr)
- ENGL 5591 - Independent Study (1.0 - 4.0 cr)
- ENGL 8191 - Seminar: American Literature (4.0 cr)

Historical and Material Context of Creative Writing

Take 1 or more course(s) from the following:

- ENGL 5562 - Studies in 19th-Century British Literature (4.0 cr)
- ENGL 5564 - Studies in British Literature after 1900 (4.0 cr)
- ENGL 5572 - American Renaissance (4.0 cr)
- ENGL 5574 - Studies in American Literature to 1914 (4.0 cr)
- ENGL 5591 - Independent Study (1.0 - 4.0 cr)
- ENGL 5661 - Publishing the Middle Ages (4.0 cr)
- ENGL 5662 - The Making of a Major Author: The Scholarly Edition in 17th- and 18th-Century England (4.0 cr)
- ENGL 5663 - Readers and the History of Books (4.0 cr)



- ENGL 5665 - The American Literary Marketplace (4.0 cr)
- ENGL 5821 - History of the English Language (4.0 cr)
- ENGL 5902 - Teaching Writing (4.0 cr)
- ENGL 8171 - Seminar in Pre-1800 British Literature (4.0 cr)
- ENGL 8181 - Seminar in British Literature, Late 18th - 20th Century (4.0 cr)
- ENGL 8191 - Seminar: American Literature (4.0 cr)
- WRIT 5230 - Web Design and Digital Culture (3.0 cr)
- WRIT 5260 - Visual Rhetoric and Culture (3.0 cr)

Project B

Take exactly 2 credit(s) from the following:

- ENGL 8094 - Plan B Research (DRS) (1.0 cr)
- WRIT 8094 - Plan B Research (DRS) (1.0 cr)



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 2020
- 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.

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)

Prerequisites for Admission

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

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.

Required Courses (8 cr)

Take 8 or more credit(s) from the following:

- ENGL 5xxx
- ENGL 8xxx



Duluth Campus

Geographical Information Science Post-baccalaureate Certificate

Geography & Philosophy

College of Liberal Arts

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

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 16
- This program does not require summer semesters for timely completion.
- Degree: Geographic Information Science 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.

The post baccalaureate certificate in GIS is a 16-credit program designed for graduate students or professionals seeking to acquire advanced skills in geographical information analysis to complement their main area of expertise.

Certificate students are required to take one fundamental class on GIS principles, methods and techniques and choose three elective courses that cover various applications of GIS. Electives can be selected based on each student specific interests and/or schedule. It should be noted that a sequence of 3 electives are offered as night classes, allowing students who can take only night classes to complete the certificate in two years.

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

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.

Required Core (4 cr)

[GIS 4565](#) - Geographic Information Science Intensive: Theory, Analysis, and Applications (4.0 cr)
or GIS 4xxx or 5xxx (4 cr) if GIS 3564 has already been completed

Electives (12 cr)

Take 3 or more course(s) totaling 12 or more credit(s) from the following:

Take at most 4 credit(s) from the following:

- GIS 4xxx
- Take 2 or more course(s) totaling 8 or more credit(s) from the following:
 - GIS 5xxx



Duluth Campus

Linguistics Minor

English Linguistics and 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: mliinn@d.umn.edu

Website: <http://www.d.umn.edu/writ>

- Program Type: Graduate free-standing minor
- Requirements for this program are current for Fall 2020
- 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)

Prerequisites for Admission

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.

Required Courses (6 cr)

Take 6 or more credit(s) from the following:

- [ENGL 5802](#) - English Language for Educators (4.0 cr)
- [ENGL 5821](#) - History of the English Language (4.0 cr)
- [LING 5852](#) - Practicum in Teaching Linguistics (3.0 cr)
- [LING 8591](#) - Independent Study in Linguistics (1.0 - 3.0 cr)

Duluth Campus

Music M.M.

Music

College of Liberal 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 (218-726-7890; fax: 218-726-8210)

Email: umdmumm@d.umn.edu

Website: <http://sfa.d.umn.edu/about/departments/department-music/majors-minors/graduate-programs>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 31
- 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. Students in music education and performance undertake essential 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 the 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.

Other requirements to be completed before admission:

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 MM 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
- 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 30 to 31 major credits and up to null credits outside the major. The final exam is written and oral. A capstone project is required.

Capstone Project: For the MM in music education, the Plan B project is a directed paper. 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 3 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 directed project paper. For the MM in music performance, the student's graduate recital fulfills the directed 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.

Core Courses (10 cr)

[MU 5201](#) - Advanced Music History (2.0 cr)

[MU 8101](#) - Graduate Music Theory (2.0 cr)

[MU 8222](#) - Music Bibliography and Research (3.0 cr)

[MU 8900](#) - Psychology of Music (3.0 cr)

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.

Applied Conducting

Applied Conducting (20 cr)

Applied Music

Take 8 or more credit(s) from the following:

- [MU 8701](#) - Graduate Applied Conducting (1.0 - 2.0 cr)

Ensembles

Take 2 or more credit(s) from the following courses:

MU 4xxx Performance Ensembles

[MU 5510](#) - Opera Studio (1.0 cr)

Graduate Recital

[MU 8300](#) - Graduate Recital (1.0 cr)

Literature Courses

Instrumental

Students must take MU 5204 twice for a total of 4 credits, or MU 5207 twice, plus MU 5204, for a total of 4 credits.

[MU 5204](#) - Instrumental Ensemble Literature (2.0 cr)

[MU 5207](#) - Instrumental Chamber Music Literature (1.0 cr)

Take 4 or more credit(s) from the following:

- [MU 5203](#) - Advanced Choral Literature (2.0 cr)
- [MU 5206](#) - Vocal Solo Literature (1.0 - 2.0 cr)
- [MU 5208](#) - Vocal Chamber Literature (1.0 cr)

Pedagogy

[MU 8401](#) - Graduate Music Pedagogy (1.0 cr)

Electives

MU 8302 may be repeated for a maximum of 4 credits. MU 8991 may be repeated for a maximum of 2 credits

Take 4 or more credit(s) from the following:

- [MU 8302](#) - Graduate Applied Music: Secondary Instrument (1.0 cr)
- [MU 8991](#) - Independent Study (1.0 - 2.0 cr)

Collaborative Piano

Collaborative Piano (21 cr)

Language prerequisites must be met either through diagnostic screening or remedial coursework. Students without two semesters of

diction on their transcript are required to complete the undergraduate diction sequence MU 1411 and MU 1412/13.

Applied Music

Take for 8 credits.

[MU 8301](#) - Graduate Applied Music: Major Instrument (2.0 cr)

Collaborative Literature

[MU 5627](#) - Art of Accompanying: Vocal Music (2.0 cr)

[MU 5628](#) - Art of Accompanying: Instrumental Music (2.0 cr)

Graduate Recital

Take MU 8300 twice for a total of 2 credits.

[MU 8300](#) - Graduate Recital (1.0 cr)

Pedagogy

[MU 8401](#) - Graduate Music Pedagogy (1.0 cr)

Ensembles

Take 2 or more credit(s) from the following:

MU 4xxx Performance Ensembles

[MU 5510](#) - Opera Studio (1.0 cr)

Take 4 or more credit(s) from the following:

- [MU 4541](#) - Chamber Music (1.0 cr)
- [MU 4621](#) - Piano Pedagogy and Practicum I (2.0 cr)
- [MU 4622](#) - Piano Pedagogy and Practicum II (2.0 cr)
- [MU 5205](#) - Instrumental Solo Literature (1.0 cr)
- [MU 5206](#) - Vocal Solo Literature (1.0 - 2.0 cr)
- [MU 5207](#) - Instrumental Chamber Music Literature (1.0 cr)
- [MU 8302](#) - Graduate Applied Music: Secondary Instrument (1.0 cr)
- [MU 8991](#) - Independent Study (1.0 - 2.0 cr)

Music Education

Music Education (21)

Applied Music

[MU 8302](#) - Graduate Applied Music: Secondary Instrument (1.0 cr)

Education Electives

Take 3 or more credit(s) from the following:

- [EDAD 5911](#) - Leadership and Personal Growth (3.0 cr)
- [EDAD 5913](#) - Communication and Community Relations (3.0 cr)
- [EDAD 5914](#) - Education Policy (3.0 cr)
- [EDAD 5918](#) - Continuous Improvement Processes for Schools (3.0 cr)
- [EDUC 7008](#) - Foundations of Teaching and Learning: Curriculum Theory and Design (3.0 cr)
- [EDUC 7009](#) - Assessment of Learning (3.0 cr)

Ensembles

Take 2 or more credit(s) from the following courses:

MU 4xxx Performance Ensembles

[MU 5510](#) - Opera Studio (1.0 cr)

Music Education

[MU 8601](#) - Foundations of Music Education (3.0 cr)

[MU 8600](#) - Methods of Research in Music Education (3.0 cr)

[MU 8605](#) - Curricular Trends in Music Education (3.0 cr)

Music Electives

Take 3 or more credit(s) from the following:

- [MU 5203](#) - Advanced Choral Literature (2.0 cr)
- [MU 5204](#) - Instrumental Ensemble Literature (2.0 cr)
- [MU 5205](#) - Instrumental Solo Literature (1.0 cr)
- [MU 5206](#) - Vocal Solo Literature (1.0 - 2.0 cr)
- [MU 5207](#) - Instrumental Chamber Music Literature (1.0 cr)
- [MU 5208](#) - Vocal Chamber Literature (1.0 cr)
- [MU 8302](#) - Graduate Applied Music: Secondary Instrument (1.0 cr)
- [MU 8701](#) - Graduate Applied Conducting (1.0 - 2.0 cr)
- [MU 8991](#) - Independent Study (1.0 - 2.0 cr)

Plan B Project

Take 3 or more credit(s) from the following:

- [MU 8899](#) - Directed Project in Music Education (1.0 - 12.0 cr)

Performance

Performance (20 cr)

Student must complete a minimum of 20 credits; additional ensemble or electives may be taken to reach 20 credits.

Applied Music



[MU 8301](#) - Graduate Applied Music: Major Instrument (2.0 cr)

Ensemble

Take 2 or more credit(s) from the following:

MU 4xxx Performance Ensembles

[MU 5510](#) - Opera Studio (1.0 cr)

Graduate Recital

[MU 8300](#) - Graduate Recital (1.0 cr)

Literature Courses

Instrumental and Piano Performance and Pedagogy

[MU 5204](#) - Instrumental Ensemble Literature (2.0 cr)

[MU 5207](#) - Instrumental Chamber Music Literature (1.0 cr)

[MU 5205](#) - Instrumental Solo Literature (1.0 cr)

or **Vocal**

[MU 5203](#) - Advanced Choral Literature (2.0 cr)

[MU 5208](#) - Vocal Chamber Literature (1.0 cr)

[MU 5206](#) - Vocal Solo Literature (1.0 - 2.0 cr)

Pedagogy

[MU 8401](#) - Graduate Music Pedagogy (1.0 cr)

Electives

MU 8302 may be repeated for a maximum of 4 credits. MU 8991 may be repeated for a maximum of 2 credits.

Instrumental and Vocal Electives

Take 4 or more credit(s) from the following:

•[MU 8302](#) - Graduate Applied Music: Secondary Instrument (1.0 cr)

•[MU 8701](#) - Graduate Applied Conducting (1.0 - 2.0 cr)

•[MU 8991](#) - Independent Study (1.0 - 2.0 cr)

or **Piano Performance and Pedagogy Electives**

Take 4 or more credit(s) from the following:

•[MU 8991](#) - Independent Study (1.0 - 2.0 cr)

Duluth Campus

Professional Studies in Multidisciplinary Research & Creativity M.P.S.

College of Liberal Arts - Adm

College of Liberal Arts

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

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- 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 interdisciplinary, self-designed Master of Professional Studies program prioritizes applied research skills, creative and innovative problem-solving, socially conscious leadership, and the integration of theory and practice across disciplines. By engaging multiple disciplinary approaches to a selected problem, students develop their capacity to identify, delineate, and research key problems, building an empowered learning approach to their own professional studies. With a Plan B project-based structure, the Multidisciplinary Research & Creativity program consists of three core courses (12 credits) and 18 credits of course work (for a total of 30 credits) across disciplines, along with a Plan B capstone project and oral exam. Earning the degree of MPS (Master of Professional Studies), students join a cadre of students nationally and internationally who seek applied, interdisciplinary graduate study to develop and enhance their professional studies.

The Plan B project can be expected to develop as an expansion of work done in a course or another topic of special interest, and can be constituted through multiple research papers, participatory media products, or other learning objects. Plan B papers, projects, media, or other objects are submitted to the examining committee before the student's final oral presentation and examination and represent 100 hours of independent research.

Program Delivery

This program is available:

- partially online (between 50% to 80% of instruction is online)

Prerequisites for Admission

Other requirements to be completed before admission:

Completed applications should include official transcripts, an essay delineating their reasons for pursuing the MPS in Multidisciplinary Research & Creativity and describing their education and career experiences, and three letters of recommendation from persons in a position to evaluate the applicant's potential for success. Scores on the Graduate Record Exam or an equivalent exam should be submitted as well if taken. At this time GRE scores are preferred but not required.

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
- 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 30 major credits and 18 credits outside the major. The final exam is written and oral. A capstone project is



required.

Capstone Project: The Plan B project can be expected to develop as an expansion of work done in a course or another topic of special interest, and can be constituted through multiple research papers, participatory media products, or other learning objects. Plan B papers, projects, media, or other objects are submitted to the examining committee before the student's final oral presentation and examination and represent 100 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.

Core Courses (12 cr)

[MPS 8001](#) - Theories, Methods and Applications of Graduate Study (4.0 cr)

[MPS 8501](#) - Seminar: Community Engagement (4.0 cr)

[MPS 8502](#) - Seminar: International Perspectives (4.0 cr)

Multidisciplinary Requirements (18 cr)

Remaining credits from social sciences and humanities courses within the College of Liberal Arts that carry graduate credit. These courses can be taken outside of CLA with approval from extra-collegiate faculty members. Use of 4xxx courses toward program requirements is permitted under certain conditions with advisor and director of graduate studies approval.

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 106, 1123 University Drive, Duluth, MN 55812 (218-726-7332)

Email: umdmtag@d.umn.edu

Website: <http://www.umdmtag.org>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 38
- 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's of tribal administration and governance (MTAG) 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. 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. Weekend sessions meet four times per semester on Friday evenings and all day Saturday, or students may choose to participate entirely by remote connection.

Program Delivery

This program is available:

- completely online (all program coursework can be completed online)
- 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 from a regionally accredited institution in the US or a comparable degree from an officially recognized college or university outside the US may apply for admission.

Special Application Requirements:

Each cohort capacity is 20 students. The program is open until filled, with an August 15th deadline. 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 MTAG 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
- 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 38 major credits and up to 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 9 cr)

[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 9 cr)

[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)

Semester Three (Fall, Year Two 11 cr)

[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)

[MTAG 5997](#) - Tribal Administration and Governance Directed Project (2.0 cr)

Semester Four (Spring, Year Two 9 cr)

[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

Tribal Resource and Environmental Stewardship M.T.R.E.S.

American Indian Studies

College of Liberal Arts

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

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36
- This program does not require summer semesters for timely completion.
- Degree: Master of Tribal Res and Env Stewardship M T R E S

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 in tribal resource and environmental stewardship is an applied degree designed to meet the professional and leadership needs of tribal natural resources and environmental programs. Students will develop fundamental knowledge and skills for natural resources careers responsive to community needs and aspirations. Those who currently work or aspire to work in natural resources programs in tribal governance and related contexts will benefit from this program's emphasis on integrated approaches to the stewardship and protection of natural resources based upon Indigenous environmental systems and worldviews. The curriculum is based upon the interrelationship of biological, physical, and cultural systems. Required courses address program operations, sustainability, and integrated ecosystems studies. Elective course and the capstone project provide opportunity for personalized areas of focus.

Program delivery is designed to accommodate working professionals and support existing commitments to families and home communities. Partially online course delivery including several face-to-face meetings each semester provides 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.

Other requirements to be completed before admission:

Program is designed to meet the needs of tribal natural resource management. Natural resource professionals have a wide variety of expertise ranging across the sciences, liberal arts, and business and economics. Students entering the program will have Bachelor's degree but no specific disciplinary requirements are necessary.

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 36 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.

Capstone Project: The directed project is the capstone experience of the MTRES program, and is based on the plan previously approved in the seminar course. There will be flexibility to do wide range of projects: internships, service projects, research projects, or other activities. Students will be required to choose a project related to tribal natural resource stewardship that engages the community and involves communication with others.

This program may be completed with a minor.

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

Course Requirements (28 cr)

[TRES 5100](#) - Foundations of Indigenous Environmental Systems and Worldviews (Bioregionalism) (3.0 cr)

[TRES 5101](#) - Tribal Natural Resource Program Management 1 (3.0 cr)

[TRES 5102](#) - Tribal Natural Resource Program Management 2 (3.0 cr)



- TRES 5201 - Integrated Ecosystems Stewardship 1 (3.0 cr)
- TRES 5202 - Integrated Ecosystems Stewardship 2 (3.0 cr)
- TRES 5301 - Tribal Natural Resource Economics (3.0 cr)
- TRES 5400 - Directed Project Seminar (1.0 cr)
- TRES 5994 - Tribal Natural Resource Stewardship Directed Project (3.0 cr)
- MTAG 5110 - Principles of Tribal Sovereignty I (3.0 cr)
- MTAG 5120 - Principles of Tribal Sovereignty II (3.0 cr)

Elective Coursework

Take at least 2 courses, selected in consultation with the director of graduate studies, for a minimum of 8 credits. One 4-level course, up to 4 credits, may be applied as an elective.



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 West 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 2020
- Length of program in credits: 62
- 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.

Other requirements to be completed before admission:

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

Special Application Requirements:

Applicants must provide at least three letters of recommendation, two of which should be from academic staff familiar with the applicant and a personal statement is also required.

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
- 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 47 major credits and up to null 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.

All Plan B projects must be pre-approved by the student's examining committee, which also grants final approval.

In addition to the 47 credits required for the MA, at least 15 credits of clinical internship, externship, and practicum must be taken to meet accreditation standards of the Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association (ASHA), and to ensure qualification for ASHA certification. Beyond the internship required for the MA (CDS 8397), the department offers internship courses to fulfill CAA requirements. All courses are chosen in consultation with the advisor and the clinical director, and are subject to approval by the director of graduate studies.

Required Courses (47 cr)

Take the following courses to meet the 47-credit minimum for the MA. Complete CSD 5100 for a total of 3 credits, CSD 8099 for a total of 3 credits and CSD 8397 for a total of 4 credits.

- CSD 5100 - Research Methods in Communication Disorders (1.0 - 3.0 cr)
- CSD 5142 - Introduction to Diagnosis of Communication Disorders (3.0 cr)
- CSD 5200 - Dysphagia (3.0 cr)
- CSD 5205 - Pediatric Dysphagia (1.0 cr)
- CSD 5230 - Advanced Applications in Communication Modalities (4.0 cr)
- CSD 5250 - Seminar in Augmentative and Alternative Communication (1.0 cr)
- CSD 5260 - Seminars in Orofacial Disorders (2.0 cr)
- CSD 5301 - Language Disorders in Infants, Toddlers, and Preschoolers (2.0 cr)
- CSD 5302 - Language Disorders in School-Age Children (2.0 cr)
- CSD 5500 - Voice Disorders (3.0 cr)
- CSD 8099 - Projects in Communication Disorders (1.0 cr)
- CSD 8205 - Advanced Fluency Disorders (3.0 cr)
- CSD 8211 - Professional Issues in Communication Disorders I (1.0 cr)
- CSD 8212 - Professional Issues in Communication Disorders II (1.0 cr)
- CSD 8230 - Neurogenic Language Disorders (4.0 cr)
- CSD 8231 - Neurogenic Speech Disorders (3.0 cr)
- CSD 8232 - Mgmt of Communication Disorders in Persons with Tracheostomy, Ventilator Dependency, & Laryngectomy (1.0 cr)
- CSD 8235 - Counseling Applications in Communication Disorders (2.0 cr)
- CSD 8350 - Applied Clinical Methods in CSD (1.0 cr)
- CSD 8397 - On-Campus Graduate Internship in Communication Disorders I (1.0 - 4.0 cr)

Additional CSD Internship/Externship Courses (15 cr)

All courses are chosen in consultation with the advisor and the clinical director, and are subject to approval by the director of graduate studies.

Take 15 or more credit(s) from the following:

- CSD 8497 - On-Campus Graduate Internship in CSD II (1.0 - 5.0 cr)
- CSD 8597 - Part-Time CSD Graduate Internship in Education Settings (5.0 cr)
- CSD 8697 - Part-Time CSD Graduate Internship in Medical Setting (5.0 cr)
- CSD 8797 - Full-Time CSD Graduate Externship in Education Settings (6.0 cr)
- CSD 8897 - Full-Time CSD Graduate Externship in Medical Settings (6.0 cr)
- CSD 8997 - Graduate Practicum in Communication Disorders (1.0 cr)

Duluth Campus

Community College Teaching Postbaccalaureate Certificate

Education

College of Education and Human Service Professions

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

Contact Information:

UMD Education
150 EduE
412 Library Dr
Duluth, MN 55812
218-726-7233

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 14 to 16
- This program does not require summer semesters for timely completion.
- Degree: Community College Teaching PBacc 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.

The Community College Teaching Certificate program will provide opportunity for science related discipline students to learn how to be an effective teacher in a college setting and provide the foundation for those who wish to pursue a Minnesota teaching licensure.

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.

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.

Required Courses

[EDSE 4204](#) - Designing Learning Environments and Lessons (3.0 cr)
or [EDSE 5204](#) - Designing Learning Environments (3.0 cr)
[EDSE 4501](#) - Adolescent/Adult Development and Learning Theory (3.0 cr)
or [EDSE 5501](#) - Adolescent/Adult Development and Learning Theory (3.0 cr)
[EDSE 4525](#) - Assessment for Secondary Education (3.0 cr)
or [EDSE 5525](#) - Assessment for Secondary Education (3.0 cr)
[EDSE 5000](#) - Introduction to Post-Secondary Teaching (2.0 cr)
EDSE 5xxx - 3 - 5 credits, adviser prior approval required.

Duluth Campus

Education M.Ed.

Education

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://cehsp.d.umn.edu/departments-centers/department-education/programs/master>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- 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 (MEd) 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:

- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)

Prerequisites for Admission

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

A bachelor's degree is required for admission.

Other requirements to be completed before admission:

Preferred candidates will have a GPA of 2.80 or higher and two years professional experience or demonstrated experience working with learners.

Special Application Requirements:

Please see the MEd application information found at: <https://cehsp.d.umn.edu/departments-centers/department-education/programs/master-education-med/application>

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

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, research, and complete a final capstone project.

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.

The MEd 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, and complete a final capstone project.

All policies relating to degree requirements are detailed in the student handbook.

Required Courses (24 cr)

Take EDUC 5990 for 1 credit.

[EDUC 5990](#) - Research Project (1.0 - 6.0 cr)

[EDUC 7001](#) - Introduction to Graduate Study (3.0 cr)

[EDUC 7002](#) - Human Diversity and Exceptionality (3.0 cr)

[EDUC 7004](#) - Foundations of Educational Research (3.0 cr)

[EDUC 7006](#) - Ethics and Professionalism in Education (2.0 cr)

[EDUC 7008](#) - Foundations of Teaching and Learning: Curriculum Theory and Design (3.0 cr)

[EDUC 7009](#) - Assessment of Learning (3.0 cr)

[EDUC 7011](#) - Integrated Research in Practice (3.0 cr)

[EDUC 7016](#) - Qualitative Methods for Educational Research (3.0 cr)

or [EDUC 7018](#) - Statistics for Educational Research (3.0 cr)

Electives (6 cr)

Electives are determined in consultation with the director of Graduate Studies first year) and the graduate advisor (second year).

Duluth Campus

Environmental Education M.E.Ed.

D Applied Human Sciences, Education

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 (218-726-7554)

Email: immcgraw@d.umn.edu or 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 2020
- Length of program in credits: 34
- This program does not require summer semesters for timely completion.
- 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's in 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 US 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
- 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 34 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: Final project options include a research-based thesis, research-based 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.

Credits taken before the award of a baccalaureate degree cannot be applied toward MEd requirements.

Electives must be at the 4000-level or higher; 4000-level electives must be approved for graduate credit.

Foundations (2 cr)

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

Instruction (5 cr)

[ENED 5163](#) - Outdoor Education Methods (3.0 cr)

[ENED 5850](#) - Classroom Applications (2.0 cr)

Program Development, Implementation, and Evaluation (10 cr)

[ENED 4315](#) - Operations and Management (4.0 cr)

[ENED 5625](#) - Program Development and Evaluation (3.0 cr)

[ENED 5855](#) - Programming for School Systems (3.0 cr)

Research (13 cr)

Take the following courses for 7 credits and 6 research project credits for a total of 13 credits:

[ENED 5100](#) - Research Design and Methods in the Social Sciences (3.0 cr)

[ENED 5560](#) - Current Research and Issues (3.0 cr)

[ENED 5998](#) - Outdoor Education Seminar (1.0 cr)

Research Project

Must be taken for a total of 6 credits.

[EDUC 5990](#) - Research Project (1.0 - 6.0 cr)

or [ENED 5990](#) - Research Project (1.0 - 6.0 cr)

Electives (4 cr)

Courses supporting research area or career goals.

Duluth Campus

Environmental Education Postbaccalaureate Certificate

D Applied Human Sciences, Education

College of Education and Human Service Professions

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

Contact Information:

Email: ceed@d.umn.edu

Website: <http://www.d.umn.edu/ceed/ee-certificate-overview.html>

- Program Type: Post-baccalaureate credit certificate/licensure/endorsement
- Requirements for this program are current for Fall 2020
- Length of program in credits: 12 to 13
- This program requires summer semesters for timely completion.
- 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 post-baccalaureate certificate 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 certificate 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.

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 towards program requirements is not permitted.

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

Required Coursework (12 cr)

Take the following courses. ENED 5991 must be taken for 3 credits if selected.

- [ENED 5163](#) - Outdoor Education Methods (3.0 cr)
- [ENED 5165](#) - Theories and Models in Outdoor Education (2.0 cr)
- [ENED 5850](#) - Classroom Applications (2.0 cr)
- [ENED 5325](#) - Sustainability Issues Investigation (2.0 cr)
 - or [ENED 5855](#) - Programming for School Systems (3.0 cr)
 - or [TRES 5100](#) - Foundations of Indigenous Environmental Systems and Worldviews (Bioregionalism) (3.0 cr)
- [ENED 5343](#) - Advanced Field Interpretive Techniques (3.0 cr)
 - or [ENED 5991](#) - Independent Study (1.0 - 6.0 cr)

Duluth Campus

Psychological Science M.A.

Psychology

College of Education and Human Service Professions

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

Contact Information:

UMD Psychology

320 BohH D147A

1207 Ordean Court

Duluth, MN 55812

218/726-7808

Email: maps@d.umn.edu

Website: <http://cehsp.d.umn.edu/departments-centers/department-psychology/programs/graduate>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36 to 50
- 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 master of arts in psychological science program prepares graduate students with research-based knowledge and skills essential to successful careers in organizational, educational, clinical, and counseling settings. The program has three integrated tracks: 1) clinical/counseling psychology; 2) experimental psychology; and 3) industrial-organizational psychology. All three tracks include the same basic core courses in statistics, research methodology, and introduction to graduate studies. All three tracks have a 6-credit Plan B requirement (clinical/counseling track also has Plan C as an option). In addition, a number of courses in main topics of psychology are required of every student enrolled in the program.

For all three tracks, the degree and research-based preparation should also facilitate graduates' admission into PhD and PsyD programs in psychology.

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 psychology baccalaureate degree from an accredited US institution/foreign equivalent; other majors will be considered if comparable coursework in statistics and research methods has been completed

Other requirements to be completed before admission:

In addition to the general admission requirements for all applicants to our program, the final pool of clinical/counseling (CC) track applicants will be invited to an on-campus or technology-assisted interview before the admission decision. Applicants to the CC track must also demonstrate successful completion of an undergraduate abnormal psychology course. Students applying to the CC track should also know, per university policy, criminal background checks will be required before enrolling in internships. We recommend applicants to the I/O track have passed an introductory I/O psychology or similar course prior to their entrance into the program.

Special Application Requirements:

Applicants must supply:

1. Official transcripts from all colleges and universities attended
2. A brief personal statement indicating why an advanced degree in Psychology is of interest and their choice of track
3. Three letters of recommendation
4. Graduate Record Examination verbal and quantitative test scores
5. Scores from the TOEFL examination (for international students whose native language is not English)
6. Work sample
7. Resume or CV

Departmental deadline for admission is February 15 of the year of admission. Pending available space, applications submitted after the deadline may be considered. Admission to the program will be for fall semester only.

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

- GRE

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

- TOEFL

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

Plan B: Plan B requires 36 to 50 major credits and up to null credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: Students completing Plan B are expected to conduct an empirical research project, meta-analysis, or applied project under the direction of a faculty advisor. Serving as the capstone of the MAPS education, the Plan B project documents the students abilities in scientific inquiry, analysis, and writing. Furthermore, it contributes to knowledge in the field of psychology and related areas, or in the case of applied projects, addresses applied concerns or resolves applied problems. Students must receive approval from their examination committee prior to conducting the research. The Final Plan B project includes a written paper and an oral defense with the students examination committee. The Plan B is taken for 6 credits.

Plan C: Plan C requires 36 to 50 major credits and up to 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.

All 3 tracks have a 6 credit Plan B research project in psychology requirement; the clinical/counseling track students may choose to do a Plan C and complete 6 additional credits instead of the research project. Students must maintain a GPA of 3.0 or better and must earn a grade of B or better for each course. Furthermore, students must not have more than 8 credits or 2 courses with an incomplete for longer than 2 semesters. The director of the MAPS program will advise newly admitted students during their first semester in the program. Before mid-term of the second semester in which the student is enrolled in the program, the director of graduate studies will be responsible for assuring that all students select a faculty advisor and establish an examination committee, and will also be the instructor of record for the introduction to graduate studies course. A final oral examination covering the Plan B project will be given at the end of the student's academic program. The oral examination will be conducted by the student's advising/examining committee. The examination will require the student to demonstrate an understanding of the theories, methods, and analyses employed in his or her research project.

For the Experimental and Industrial Organizational tracks, at least 27 graduate-level coursework credits must be earned at the University while enrolled as a degree-seeking student in this program. For the clinical counseling track, at least 41 graduate-level coursework credits must be earned at the University while enrolled as a degree-seeking student in this program. A maximum of 9 credits can be transferred from another institution.

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.

Clinical/Counseling

The clinical-counseling track follows the scientist-practitioner model of training through its emphasis on current, empirically-based diagnostic and intervention methods and opportunities for students to conduct independent projects. Students will be prepared to work as successful mental health service providers with diverse populations in a variety of settings, or continue on to doctoral-level graduate studies. The curriculum is designed to provide the required coursework and skills training for graduates to be eligible for licensure as

Licensed Professional Clinical-Counselors through the Minnesota Board of Behavioral Health and Therapy.

At least 41 graduate-level coursework credits must be earned at the University while enrolled as a degree-seeking student in this program. A maximum of 9 credits can be transferred from another institution.

Clinical/Counseling Track (50 cr)

- PSY 5021 - Advanced Developmental Psychology (3.0 cr)
- PSY 5052 - Advanced Statistics I (3.0 cr)
- PSY 5120 - Career and Lifestyle Development (2.0 cr)
- PSY 5121 - Psychopathology Over the Lifespan (3.0 cr)
- PSY 8021 - Research Methods and Evaluation (3.0 cr)
- PSY 8097 - Clinical-Counseling Practicum (3.0 cr)
- PSY 8103 - Introduction to Graduate Studies (0.0 cr)
- PSY 8221 - Individual Adult and Group Therapy/Counseling (3.0 cr)
- PSY 8223 - Child, Adolescent, and Family Therapy (3.0 cr)
- PSY 8224 - Clinical Treatment Planning (3.0 cr)
- PSY 8231 - Assessment I: Foundations and Cognitive Assessment (3.0 cr)
- PSY 8232 - Assessment II (3.0 cr)
- PSY 8301 - Multicultural Foundations in Clinical/Counseling Psychology (3.0 cr)
- PSY 8302 - Ethical and Legal Issues in Therapy and Counseling (3.0 cr)
- PSY 8197 - Clinical Counseling Internship (3.0 cr)

Plan B

- PSY 8099 - Research Project in Psychology (6.0 cr)

or **Plan C**

- Electives (6 cr)

Experimental

Experimental psychology encompasses a variety of experimental research areas within psychology. Our faculty have background and current research interest in:

- Biopsychology
- Cognition
- Social psychology
- Evolutionary psychology
- Perception and action
- Psycho-linguistics

Graduate students are prepared for doctoral-level programs in various areas of psychology, as well as careers in research and academic instruction.

At least 27 graduate-level coursework credits must be earned at the University while enrolled as a degree-seeking student in this program. A maximum of 9 credits can be transferred from another institution.

Required Courses (36 cr)

- PSY 5021 - Advanced Developmental Psychology (3.0 cr)
- PSY 5052 - Advanced Statistics I (3.0 cr)
- PSY 5401 - Advanced Social Psychology (3.0 cr)
- PSY 5621 - Cognition and Emotion (3.0 cr)
- PSY 5631 - Biological Bases of Behavior (3.0 cr)
- PSY 8021 - Research Methods and Evaluation (3.0 cr)
- PSY 8052 - Advanced Statistics II (3.0 cr)
- PSY 8099 - Research Project in Psychology (6.0 cr)
- PSY 8103 - Introduction to Graduate Studies (0.0 cr)

Must be approved by advisor.

Take 9 or more credit(s) from the following:

- Elective credit

Industrial Organizational

Industrial-organizational psychology trains students to apply theory and methods of psychology in order to solve workplace issues using a scientist-practitioner approach. Students will be immersed in classic and contemporary research in order to acquire skills in areas of personnel selection, employee motivation, training and development, performance management and evaluation, and organizational change and development. Our program prepares students for doctoral-level training, as well as employment in a variety of organizational settings.

At least 27 graduate-level coursework credits must be earned at the University while enrolled as a degree-seeking student in this program. A maximum of 9 credits can be transferred from another institution.



Required Courses (36 cr)

PSY 5052 - Advanced Statistics I (3.0 cr)

PSY 5701 - Advanced Personnel Psychology (3.0 cr)

PSY 5702 - Advanced Organizational Psychology (3.0 cr)

PSY 8021 - Research Methods and Evaluation (3.0 cr)

PSY 8052 - Advanced Statistics II (3.0 cr)

PSY 8099 - Research Project in Psychology (6.0 cr)

PSY 8103 - Introduction to Graduate Studies (0.0 cr)

PSY 8701 - Performance Evaluation and Management (3.0 cr)

PSY 8705 - Organizational Systems & Development (3.0 cr)

PSY 8706 - Personnel Training & Development (3.0 cr)

Must be approved by advisor.

Take 6 or more credit(s) from the following:

- Elective credit



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: umdsww@d.umn.edu

Website: <http://www.d.umn.edu/sw>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 34 to 51
- 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's of social work (M.S.W.) program offers an advanced generalist practice curriculum 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. In addition to the 51-credit generalist program, a 34-credit advanced generalist program is available to applicants with a bachelor of social work degree from a program accredited by the Council of Social Work Education. Students can complete additional coursework towards optional emphases in child welfare practice and clinical social work. Completion of the M.S.W. can satisfy all or a majority of clinical content hours for licensure.

Accreditation

This program is accredited by the 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.

Other requirements to be completed before admission:

Completion of at least 6 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 or developmental psychology and a college-level statistics course. The biology/psychology 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 are eligible for the Advanced Generalist Program.

The following must be submitted through the online application: the Department's Supplemental Application form, a personal statement, a writing sample, and a resume. Three letters of recommendation are required on department's recommendation form. Generalist Program students are admitted in the fall semester only. Advanced Generalist Program students have the option of starting either in the summer or fall semester.

The UMD MSW program does not accept 4000 or 5000 level coursework at the pre-baccalaureate level to be applied to a graduate degree. Post-baccalaureate social work courses from a CSWE accredited program may be considered to meet generalist program requirements (waiving a course) or possible elective credits equivalent to a 5000 level, or at the discretion of the DGS. Courses can be completed as a non-degree seeking student. Courses must be taken for credit and an official grade received. Audited coursework will not be considered.

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
- 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 to 51 major credits and 0 to 6 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 3.00 is required for students to remain in good standing.

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

The UMD Department of Social Work was designed to help students meaningfully integrate, on an ongoing basis, the knowledge and skills they acquire throughout the master's curriculum. Specialized papers on: professional competencies, social justice, ethical practice, and effective practice in working with diverse communities are integrated into specific course assignments. All MSW graduates must demonstrate competence in those learning areas believed to be key to quality master's-level social work practice, and in conjunction with standards identified by the Council on Social Work Education.

The Generalist Program requires two field placements in human service agencies; the Advanced Generalist Program requires one field placement. A level of personal and professional competencies is demonstrated by proficiency in social work courses and field placement evaluations.

All MSW students must complete a minimum of 20 Social Work Graduate credits through University of Minnesota CSWE accredited programs. This means admitted Generalist students can transfer in up to 31 credits from another CSWE accredited institution, provided they left that program in good standing. Students will be required to provide documentation, such as syllabi and official transcripts, to verify their coursework. It is the student's responsibility to provide documentation as requested. Students are appraised that variations in credit content may not transfer equally to the UMD MSW degree requirements, and they may need to complete additional credits to meet minimum credit or field practicum requirements. Additionally, the UMD Department of Social Work is not responsible for determining clinical content hours as required for licensing for coursework completed at other programs.

All students must complete the CSWE minimum requirement for practicum hours. Transfer students from other institutions must provide a copy of their Field I practicum final evaluation and provide official documentation of hours completed. Field II practicum hours also require such documentation. The Field Director will review all documentation of practicum completion in determination of potential transfer of credits. It is the student's responsibility to obtain these documents.

Graduate credits earned while enrolled in another U of M graduate program may only be considered as potential elective courses. Up to

6 elective credits outside of Social Work may be approved by the DGS. Up to 3 additional elective credits outside of social work may be considered, but must be approved by the advisor and the DGS. The student must provide syllabi from the other graduate coursework for review by designated faculty in the Department of Social Work. The Department is not responsible for determining whether these electives would meet criteria for clinical content with regard to Clinical Social Work licensing requirements.

For students seeking a second graduate degree, the Department may consider up to 6-9 credits of elective courses, as previously noted, to apply to a degree in Social Work.

Advanced or Generalist Curriculum

Advanced Curriculum -Required (28 Credits)

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

Advanced Generalist Concentration Courses (23 Credits)

SW 8802 must be taken for a total of 8 credits.

SW 8100 - Social Work with Diverse Populations (3.0 cr)

SW 8102 - Advanced Research (3.0 cr)

SW 8235 - American Indians and Social Policy (3.0 cr)

SW 8331 - Organization and Community Practice II (3.0 cr)

SW 8441 - Individual, Family and Group Practice II (3.0 cr)

SW 8802 - Field Placement II (3.0 - 8.0 cr)

Advanced Practice Course (3 Credits)

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

•SW 8031 - Advanced Practice in Child Welfare (3.0 cr)

•SW 8332 - Advanced Practice in Administration and Community Development (3.0 cr)

•SW 8443 - Advanced Practice in Mental Health (3.0 cr)

Advanced American Indian Content Course (2 Credits)

Take 1 or more course(s) totaling 2 or more credit(s) from the following:

•SW 8771 - Health in American Indian Communities (2.0 cr)

•SW 8881 - Dynamics of American Indian Families (2.0 cr)

or Generalist Curriculum - Required (48 Credits)

Generalist Courses (20 Credits)

SW 8801 must be taken for 6 credits.

SW 5101 - Human Behavior in the Social Environment (3.0 cr)

SW 5201 - Social Welfare Policy (3.0 cr)

SW 5990 - Pre-Field Work (0.0 cr)

SW 8101 - Introduction to Research (2.0 cr)

SW 8111 - Individual, Family and Group Practice I (3.0 cr)

SW 8112 - Organization and Community Practice I (3.0 cr)

SW 8801 - Field Placement I (3.0 - 6.0 cr)

Advanced Generalist Concentration Courses (23 Credits)

SW 8802 must be taken for 8 credits.

SW 8100 - Social Work with Diverse Populations (3.0 cr)

SW 8102 - Advanced Research (3.0 cr)

SW 8235 - American Indians and Social Policy (3.0 cr)

SW 8331 - Organization and Community Practice II (3.0 cr)

SW 8441 - Individual, Family and Group Practice II (3.0 cr)

SW 8802 - Field Placement II (3.0 - 8.0 cr)

Advanced Practice Course (3 Credits)

Take 1 or more course(s) totaling 3 or more credit(s) from the following:

•SW 8031 - Advanced Practice in Child Welfare (3.0 cr)

•SW 8332 - Advanced Practice in Administration and Community Development (3.0 cr)

•SW 8443 - Advanced Practice in Mental Health (3.0 cr)

Advanced American Indian Content Course (2 Credits)

Take 1 or more course(s) totaling 2 or more credit(s) from the following:

•SW 8771 - Health in American Indian Communities (2.0 cr)

•SW 8881 - Dynamics of American Indian Families (2.0 cr)

Emphases

Only students with a bachelor of social work degree from a program accredited by the Council of Social Work Education who completed the Generalist Required courses listed above may apply for the Advance Generalist Program. They may also apply for the Clinical Scholars or Child Welfare Scholars Program. Generalist Students may apply for Child Welfare Scholars Program or for the Clinical Scholars program in their second year.

Advanced Generalist Program (6 cr)

With advisor approval students may take courses outside the Social Work department.



Electives

Take 6 or more credit(s) from the following:

- SW 5xxx
- SW 8xxx

-OR-

Generalist Program (3 cr)

With advisor approval students may take courses outside the Social Work department.

Elective

Take 3 or more credit(s) from the following:

- SW 5xxx
- SW 8xxx

-OR-

Child Welfare Program (9 cr)

Students choosing this option complete SW 8031 for the Advance Practice Course.

[SW 5032](#) - Child Welfare and the Law (2.0 cr)

[SW 5215](#) - Trauma Informed Social Work Practice with Children and Adolescents (2.0 cr)

[SW 8031](#) - Advanced Practice in Child Welfare (3.0 cr)

[SW 8771](#) - Health in American Indian Communities (2.0 cr)

or [SW 8881](#) - Dynamics of American Indian Families (2.0 cr)

-OR-

Mental Health/Clinical Plan (9 cr)

Students choosing this option are advised to complete SW 8443 for the Advance Practice Course and SW 8070, Evidenced-Based Practice in Clinical Social Work.

[SW 8070](#) - Evidence-Based Practice in Clinical Social Work (3.0 cr)

[SW 8443](#) - Advanced Practice in Mental Health (3.0 cr)

[SW 5144](#) - Grief, Loss and Coping in Social Work Practice (2.0 cr)

or [SW 5280](#) - Substance Use Trends and Interventions in Social Work (2.0 cr)

[SW 8771](#) - Health in American Indian Communities (2.0 cr)

or [SW 8881](#) - Dynamics of American Indian Families (2.0 cr)



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>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- 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 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)

Prerequisites for Admission

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.

Required Electives (6 cr)

Courses should be chosen in consultation with advisor.

Take 6 or more credit(s) from the following:

- SW 5xxx
- SW 8xxx

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)

Website: <http://cehsp.d.umn.edu/departments-centers/department-education/programs/edd>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- 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](#) section of the catalog website for requirements that apply to all major fields.

Students are currently not being accepted into this program.

The doctor of education degree (EdD) 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).

Other requirements to be completed before admission:

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 EdD 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. 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 *{Inactive}*(3.0 cr)

EDUC 8016 - Theory and Practice of Qualitative Research Methods (3.0 cr)

EDUC 8017 *{Inactive}*(3.0 cr)

EDUC 8018 *{Inactive}*(3.0 cr)

EDUC 8020 - Doctoral Seminar (1.0 cr)

EDUC 8001 - Historical, Social, and Philosophical Foundations of Education (3.0 cr)

EDUC 8003 *{Inactive}*(3.0 cr)

EDUC 8005 *{Inactive}*(3.0 cr)

EDUC 8007 *{Inactive}*(3.0 cr)

EDUC 7005 *{Inactive}*(3.0 cr)

EDUC 8009 *{Inactive}*(3.0 cr)

EDUC 8021 *{Inactive}*(3.0 cr)

EDUC 8888 - Thesis Credit: Doctoral (1.0 - 24.0 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 (218-726-7440; fax: 218-726-6936)

Email: LaboMBA@d.umn.edu

Website: <http://lsbe.d.umn.edu/mba>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 32
- 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 Labovitz Master of Business Administration (MBA) program in Duluth is designed to meet the needs of those who would like to pursue a graduate management education either full-time or part-time. Part-time students can complete all program requirements in two to three years by taking evening courses (6:00 - 8:40 p.m.). Full-time students can finish the program in 12 months by taking a mix of day and evening courses.

The MBA program in Rochester is designed primarily to meet the needs of those who are currently employed full-time in professional managerial careers and who would like to pursue a graduate management education while continuing to work. Most courses offered in Rochester meet from 3:00-9:00 p.m. on Fridays, and 8:00 a.m.-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.

The Labovitz MBA is one of six in the entire state and the only program in Northern Minnesota accredited by the Association to Advance Collegiate Schools of Business International (AACSB). This accreditation means a rigorous review process and ongoing evaluations of faculty qualifications, curriculum, continuous improvement processes, assessment practices, and student and faculty resources. Only five percent of business schools worldwide are able to achieve this accreditation, which guarantees the MBA meets the highest criteria established by the management education community.

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.

All applicants must have an earned bachelor's degree from a regionally or nationally accredited college or university. Waivers of this requirement will only be permitted under special circumstances.

Other requirements to be completed before admission:

Test date must be within 2 years of program start.

Special Application Requirements:

The earned bachelors degree requirement may be waived only for students who are currently undergraduates in the Labovitz School and applying through the Integrated Undergraduate/Graduate (IUG) Option.

The preferred undergraduate GPA for admittance to the program is 3.0 (on a 4-point scale). Students who are currently undergraduates in the Labovitz School must have a minimum 3.3 GPA in order to be accepted into the IUG Option.

A GRE or GMAT score is required for all applicants except:

- *Applicants who have successfully passed the CPA exam;
- *Applicants to the PharmD/MBA Dual Career Program who have completed the PCAT with percentile scores at or above the 50th percentile in the three sections of PCAT related to quantitative ability, verbal ability, and reading comprehension;
- *Applicants with an earned undergraduate degree from the Labovitz School with a minimum GPA of 3.3
- *Applicants who have been accepted into the program through the IUG Option;
- *Applicants with a prior graduate degree from an accredited institution (see college for specific details).

A holistic review of GPA, GRE/GMAT score, prior work experience and other relevant factors is undertaken to determine admission eligibility. Other requirements to be completed before admission:

Students need to demonstrate competency in mathematics as well as the business foundation areas of Accounting, Economics, Financial Management, Human Resource Management, Marketing, Operations Management, Organizational Management, and Statistics through BUS or PMBA courses, other undergraduate business coursework, or competency tests. Students must consult with the MBA Director to determine competency fulfillment.

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

- TOEFL
 - Internet Based - Total Score: 79
 - Internet Based - Listening Score: 19
 - Internet Based - Writing Score: 21
 - Internet Based - Reading Score: 19
 - Internet Based - Speaking Score: 20
- IELTS
 - Total Score: 6.5
 - Reading Score: 6.5
 - Writing 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 32 major credits and up to 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 MBA program requires completion of 32 MBA credits. The graduate-level coursework consists of 20 semester credits in the functional areas of business and its supporting areas, plus a 3-credit capstone strategic management course. In addition, all students must complete 9 credits of electives. IUG students may complete some or all of these electives during their senior year by taking 5xxx level courses. The MBA program expects students to maintain a 2.8 GPA through completion of the program. A cumulative GPA of 2.8 is required for graduation. Acceptance of 4xxx level courses as electives is permitted only via petition and requires prior written approval from the Director of Graduate Studies.

Core Coursework (20 cr)

- [MBA 8111](#) - Business Ethics (2.0 cr)
- [MBA 8211](#) - Data Analysis and Statistics for Managers (2.0 cr)
- [MBA 8311](#) - Decision Making in Operations (3.0 cr)
- [MBA 8501](#) - Accounting for Decision Making and Control (3.0 cr)
- [MBA 8512](#) - Managerial Economics (2.0 cr)
- [MBA 8611](#) - Financial Management and Decision Making (3.0 cr)
- [MBA 8711](#) - Strategic Marketing Management (3.0 cr)



[MBA 8811](#) - Human Resource Challenges (2.0 cr)

Capstone Requirement (3 cr)

Can only be taken after MBA 8311, 8501, 8611, 8711 and 8811 are taken.

[MBA 8911](#) - Strategic Management (3.0 cr)

Electives (9 cr)

These are normally fulfilled by taking designated 1 - 3 credit electives at the 5xxx, or 8xxx level. Students can also choose from the following:

Take 9 or more credit(s) from the following:

- [MBA 8991](#) - Independent Study (1.0 - 3.0 cr)
- [MBA 8994](#) - Directed Research (1.0 - 6.0 cr)
- [MBA 8995](#) - Special Topics: (Various Titles to be Assigned) (1.0 - 3.0 cr)
- MBA 5xxx
- MBA 8xxx

Program Sub-plans

A sub-plan is not required for this program.

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

[UMD Rochester](#)

Duluth Campus

Applied Materials Science M.S.

Chemical Engineering

Swenson College of Science and Engineering

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

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- 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.

Materials science and engineering (MSE) is a field that studies the structure, property, processing and performance of materials. The MS program in applied materials science (AMS) aims to train students to handle, lead and excel at research and development projects in the field of materials science and technology. Through unique interdisciplinary and practice oriented teaching, students will be trained for careers in wide variety of fields such as aerospace, biomedical, and energy. Collaboration with regional industry partners combined with the expertise of instructors will ensure a program that will help our graduates to succeed in their respective careers.

Completion of the MS AMS program requires a minimum of 30 credit hours, which include 12 hours of required courses, 10 thesis credit hours, and at least 8 hours of elective 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.

BA or BS degree in engineering, chemistry, physics, or similar fields; other undergraduate degrees may be accepted with additional coursework required prior to beginning the program.

Other requirements to be completed before admission:

Applicants whose native language is not English must submit score(s) from one of the following tests: TOEFL, IELTS or MELAB.

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

- GRE
 - General Test - Verbal Reasoning: 550
 - General Test - Quantitative Reasoning: 600

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
- IELTS
 - Total Score: 6.5
 - Reading Score: 6.5
 - Writing 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 20 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 30 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: Master's of applied science project work as determined by faculty advisor and student with approval by the program director of graduate studies.

This program may be completed with a minor.

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

Core Requirements (12 cr)

[AMS 5101](#) - Materials Analysis & Design I (6.0 cr)

[AMS 5102](#) - Materials Analysis & Design II (6.0 cr)

Plan A or Plan B

Plan A

Electives

Only 6 elective credits may be taken at the 4xxx level.

Take 8 or more credit(s) from the following:

- [CE 5027](#) - Advanced Concrete Materials and Repair (3.0 cr)
- [CHE 4141](#) - Material and Minerals Processing (3.0 cr)
- [CHE 4142](#) - Extractive Metallurgy: An Introduction to metals' extraction (3.0 cr)
- [CHE 5131](#) - Polymer Engineering (3.0 cr)
- [CHE 5711](#) - Biomedical Engineering (3.0 cr)
- [CHEM 4373](#) - Physical Biochemistry: Statistical Bio-Thermodynamics (3.0 cr)
- [CHEM 4374](#) - Physical Biochemistry Laboratory (2.0 cr)
- [CHEM 5510](#) - Polymer Chemistry (3.0 cr)
- [CHEM 5650](#) - Computational Chemistry (3.0 cr)
- [CHEM 5714](#) - Applications of Spectroscopy (4.0 cr)
- [EE 4611](#) - Introduction to Solid-State Semiconductors (3.0 cr)
- [EE 5611](#) - Microelectronics Technology (3.0 cr)
- [GEOL 5321](#) - Theory, Practice of Scanning Electron Microscopy and X-Ray Microanalysis in Lectures (3.0 cr)
- [IE 5325](#) - Advanced Engineering Economics (3.0 cr)
- [ME 5220](#) - Advanced Mechanics of Materials (3.0 cr)
- [ME 5315](#) - Nondestructive Evaluation of Engineering Materials (3.0 cr)
- [ME 5345](#) - Smart Materials and Structures (3.0 cr)
- [PHYS 5041](#) - Optics (3.0 cr)
- [PHYS 5531](#) - Introduction to Solid State Physics (3.0 cr)

Thesis credits

[AMS 8777](#) - Thesis Credits: Master's (1.0 - 10.0 cr)

or Plan B

Only 6 elective credits may be taken at the 4xxx level.

Take 15 or more credit(s) from the following:

- [CE 5027](#) - Advanced Concrete Materials and Repair (3.0 cr)
- [CHE 4141](#) - Material and Minerals Processing (3.0 cr)
- [CHE 4142](#) - Extractive Metallurgy: An Introduction to metals' extraction (3.0 cr)
- [CHE 5131](#) - Polymer Engineering (3.0 cr)
- [CHE 5711](#) - Biomedical Engineering (3.0 cr)
- [CHEM 4373](#) - Physical Biochemistry: Statistical Bio-Thermodynamics (3.0 cr)
- [CHEM 4374](#) - Physical Biochemistry Laboratory (2.0 cr)
- [CHEM 5510](#) - Polymer Chemistry (3.0 cr)
- [CHEM 5650](#) - Computational Chemistry (3.0 cr)
- [CHEM 5714](#) - Applications of Spectroscopy (4.0 cr)
- [EE 4611](#) - Introduction to Solid-State Semiconductors (3.0 cr)
- [EE 5611](#) - Microelectronics Technology (3.0 cr)
- [GEOL 5321](#) - Theory, Practice of Scanning Electron Microscopy and X-Ray Microanalysis in Lectures (3.0 cr)
- [IE 5325](#) - Advanced Engineering Economics (3.0 cr)
- [ME 5220](#) - Advanced Mechanics of Materials (3.0 cr)
- [ME 5315](#) - Nondestructive Evaluation of Engineering Materials (3.0 cr)
- [ME 5345](#) - Smart Materials and Structures (3.0 cr)
- [PHYS 5041](#) - Optics (3.0 cr)
- [PHYS 5531](#) - Introduction to Solid State Physics (3.0 cr)



Capstone Project

[AMS 5555](#) - Applied Materials Science Project Credits (3.0 - 6.0 cr)

Duluth Campus

Chemical Engineering M.S.Ch.E

Chemical Engineering

Swenson College of Science and Engineering

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

Contact Information:

176 Engineering, 1303 Ordean Court, Duluth, MN 55812

218-726-7126

Email: umdche@d.umn.edu

Website: <http://www.d.umn.edu/che/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Chemical 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 MSChE degree combines scholarship and research in a program oriented towards students and engineering practitioners in the private and public sectors who are interested in advanced coursework and applied research. The program requires 30 credits of coursework and applied research focusing on core departmental strengths of process modeling and simulation, environmental monitoring and remediation, and transport phenomena. There are two options for completing an MSChE degree: Plan A (thesis option), and Plan B (project option). Plan A involves writing and defending a thesis which requires in-depth research equivalent to 10 credits out of total 30 credits. Plan B involves a capstone project equivalent to 3 credits (out of 30 total credits) and targets those students or practicing engineers who wish to have a hands-on learning experience solving technical problems preferably teaming up with an industrial counterpart.

Undergraduate students in the Chemical Engineering program who are interested in pursuing the Master of Chemical Engineering at UMD may apply for admission to the Integrated Undergraduate/Graduate (IUG) Program. Students in the IUG Program start their graduate coursework prior to the completion of their undergraduate degree and may apply up to 9 credits of coursework to both their undergraduate B.S.Ch.E. and graduate M.S.Ch.E. degrees. Admission to the IU Program is limited to highly qualified upper division undergraduates.

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.

Preferred minimum GPA is 3.00 in engineering and 3.25 in science.

Other requirements to be completed before admission:

B.S. in ChE or other Engineering from an ABET accredited institution or admission to the integrated undergraduate/graduate option.

Other undergraduate degrees may be accepted with additional coursework in ChE required prior to beginning the program requirements for the MS degree. Additional course work may include, ChE 2111 Material and Energy Balances, ChE 2121 Thermodynamics, ChE 3111 Fluid Mechanics, ChE 3112 Heat and Mass Transfer, ChE 4111 Separations, ChE 4301 Reaction Engineering.

Examples of such degree programs include B.S. in Biology, Biochemistry, Chemistry, Geology, or Physics.

The GRE (Graduate Record Exam) is required. Preferred minimum scores are Verbal=153 (550-old scoring system), Quantitative=160 (650-old scoring system).

For international applicants whose native language is not English, a TOEFL score preferred performance minimum is 213 on the computer-based test

Special Application Requirements:

The earned bachelors degree required may be waived only for current students in the B.S.Ch.E. program and who are applying through the Integrated Undergraduate/Graduate (IUG) option.

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

- GRE
 - General Test - Verbal Reasoning: 153
 - General Test - Quantitative Reasoning: 160

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

- TOEFL
 - Internet Based - Total Score: 213

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 A: Plan A requires 14 to 20 major credits, 0 to 6 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 24 to 30 major credits and 0 to 6 credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: TBD

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 3.0 is required for students to remain in good standing.

Students with a BS in the sciences are expected to have knowledge of material and energy balances, heat and mass transfer, fluid mechanics, thermodynamics, chemical reaction engineering, and process control. Proficiency will be determined by the completion of at least three undergraduate courses as determined by the Major Advisor and Program of Study Committee.

Only 6 elective credits may be taken at the 4xxx level. All other courses must be taken at the 5xxx level or higher.

Core Requirements (11 cr)

Must take CHE 8150 for a total of 2 credits.

[CHE 8150](#) - Seminar (1.0 cr)

Take 3 or more course(s) totaling 9 or more credit(s) from the following:

- [CHE 5021](#) - Transport Phenomena (3.0 cr)
- [CHE 5031](#) - Chemical Engineering Analysis (3.0 cr)
- [CHE 5121](#) - Advanced Thermodynamics (3.0 cr)
- [CHE 5301](#) - Advanced Chemical Reactor Design (3.0 cr)

Plan A or Plan B**Plan A Requirements****Electives**

Take at least 9 credits of electives, in consultation with the advisor.

Thesis Credits

Take at least 10 master's thesis credits

[CHE 8777](#) - Thesis Credits: Master's (1.0 - 10.0 cr)

or Plan B Requirements**Required Course**

Take 3 credits of CHE 5555.

[CHE 5555](#) - Project Credits: MEng - Chemical Engineering (3.0 - 6.0 cr)

Additional Courses

Take at least 7 additional credits, selected in consultation with the advisor.

Electives



Take at least 9 credits of electives, in consultation with the advisor.

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/graduates/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- 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 Biochemistry, Chemical Engineering, and Mechanical and Industrial 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.

General GRE is strongly encouraged, but not required.

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
- 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 15 major credits, 6 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 25 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 in the major and related fields.

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 3.0 is required for students to remain in good standing.

All students must complete 31 credits. All students must complete at least 15 credits in the major field 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.

Major Field (14 cr)

At least 14 credits in course credits have to be taken for both Plan A or Plan B programs. Other courses may be approved by the director of Graduate Studies.

Take 14 or more credit(s) from the following:

- CHEM 5xxx
- CHEM 8xxx

Chemistry Seminar (1 cr)

[CHEM 8184](#) - Seminar (1.0 cr)

Related Field (6 cr)

At least 6 credits be taken outside the major for both Plan A and Plan B programs. These credits outside the major must be taken from approved related fields.

Plan A or Plan B

Plan A

Students must take 10 thesis credits, and write and defend a thesis on original research as part of the final oral examination.

[CHEM 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

or **Plan B**

Additional 10 course credits

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 2020
- 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 Biochemistry, Chemical Engineering, and Mechanical and Industrial 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.

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.

Required Coursework (6 cr)

Take 6 or more credit(s) from the following:

- CHEM 5xxx
- CHEM 8xxx
- MDBC 5xxx
- MDBC 8xxx

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: civileng@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 2020
- 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.

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

The Civil Engineering Department offers graduate degrees in civil engineering. The master's of science (MS) 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 admitted into the Integrated Undergraduate/Graduate (IUG) Program can apply up to 9 credits of approved coursework to both their undergraduate (BSCE) and graduate (MSCE) degrees. Students must be admitted to the IUG program prior to taking courses in order to count toward graduate credits.

IUG application deadline:

December 15th for Spring admission

July 15th for Fall admission

IUG application requirements:

Letters of recommendation from two Civil Engineering faculty members

Minimum GPA of 3.35

Students must apply to IUG program at least two semesters before completing BSCE degree

Admission preference will be given to students committed to completing a thesis-based (Plan A) MS degree

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 BS degree in engineering (e.g., civil, mechanical, chemical, environmental) or the sciences (e.g., chemistry, physics, mathematics).

Other requirements to be completed before admission:

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, unless applying to the IUG program)
- 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 15 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
- 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 6 to 20 major credits, 0 to 14 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 12 to 30 major credits and 0 to 18 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 be completed with a minor.

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

A minimum GPA of 3.0 is required for students to remain in good standing.

The MS Plan A is intended for students pursuing a research emphasis and seeking in-depth knowledge in an area within civil engineering. The MS 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 MS 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 project credits (approximately 225 hours of work, including writing of the report), usually completed within one to two years.



Successful completion of CE 8094 is required prior to graduation.

Plan A or Plan B

Plan A

Course Work

Student may use up to 6 approved 4xxx credits towards program requirements. CE 4126 and CE 4255 cannot be counted toward an MS degree.

Take 6 or more credit(s) from the following:

- CE 4xxx
- CE 5xxx
- CE 8xxx

Graduate Seminar

[CE 8020](#) - Graduate Seminar (1.0 cr)

Thesis credits

Students must take CE 8777 for a minimum of 10 credits.

[CE 8777](#) - Thesis Credits: Master's (1.0 - 12.0 cr)

or **Plan B**

Course Work

Student may use up to 6 approved 4xxx credits towards program requirements. CE 4126 and CE 4255 cannot be counted toward an MS degree.

Take 6 or more credit(s) from the following:

- CE 4xxx
- CE 5xxx
- CE 8xxx

Graduate Seminar

[CE 8020](#) - Graduate Seminar (1.0 cr)

Project credits (6 cr)

Students must take CE 8094 for a minimum of 6 credits.

[CE 8094](#) - Civil Engineering Master's Project (1.0 - 6.0 cr)

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/degrees/grad/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 32
- 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 a related field. These students should be able to enroll immediately in 5xxx or 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 a related field.

Other requirements to be completed before admission:

Students with undergraduate degrees in fields other than computer science or related areas 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; MATH 3355 - Discrete Mathematics or CS 2531 - Discrete Structures for Computer Science; CS 3531 Automata & Formal Languages; and at least three of CS 4312 - Operating Systems, CS 4332 - Computer Security, CS 4422 - Computer Networks, CS 4122 - Advanced Data Structures and Algorithms, CS 4212 - Computer Graphics, CS 4322 - Database Management Systems. The appropriate math prerequisites, namely MATH 1296 - Calculus I 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
- 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 to 20 major credits, 0 to 6 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 18 to 32 major credits and 0 to 8 credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: 4 project 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.

1. Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser and director of graduate studies approval.
2. A minimum GPA of 3.00 is required for students to remain in good standing.
3. The master of science degree is offered under Plan A (thesis) and Plan B (non-thesis). At least 30 credits are required, including 12 credits from 5xxx courses or higher in computer science, 1 credit of CS 8993 Seminar each year for a total of 2 credits, and 6 credits of electives (either any 5xxx or higher courses).
4. Plan A also requires 10 thesis credits (CS 8777).
5. Plan B also requires at least 8 credits in additional courses, 5xxx or above, as well as 4 project credits (CS 8555). Except in very rare instances, the 8 credits of additional courses for Plan B must be computer science courses.
6. All courses are chosen in consultation with the student's adviser, subject to approval by the director of graduate studies. Because of this, Plan B students may want to consider filling their 6 Electives requirement credits from outside CS.
7. Normally 4xxx computer science courses may not be included in degree programs for the master of science in computer science.

Computer Science requirement (14 cr)

Take 12 or more credit(s) from the following:

- CS 5112 - Advanced Theory of Computation (4.0 cr)
- CS 5122 - Advanced Algorithms and Data Structures (4.0 cr)
- CS 5212 - Computer Graphics (4.0 cr)
- CS 5222 - Artificial Intelligence (4.0 cr)
- CS 5232 - Introduction to Machine Learning and Data Mining (4.0 cr)
- CS 5242 - Natural Language Processing (4.0 cr)
- CS 5312 - Operating Systems (4.0 cr)
- CS 5322 - Database Management Systems (4.0 cr)
- CS 5332 - Computer Security (4.0 cr)
- CS 5342 - Compiler Design (4.0 cr)
- CS 5412 - Computer Architecture (4.0 cr)
- CS 5422 - Computer Networks (4.0 cr)
- CS 5612 - Advanced Computer Graphics (4.0 cr)
- CS 5642 - Advanced Natural Language Processing (4.0 cr)
- CS 5652 - Human Computer Interaction (4.0 cr)
- CS 5732 - Advanced Computer Security (4.0 cr)

Graduate Seminar

Take 2 credits, 1 in first Fall semester and 1 in second fall semester, of graduate seminar.

CS 8993 - Seminar (1.0 cr)



Electives (6 cr)

The purpose of this requirement is to provide coursework that will support your degree program without duplicating or overlapping courses available within the graduate CS curriculum. Such courses may be chosen from any 5xxx or higher courses subject to the approval of the director of graduate studies.

Plan A or Plan B (10 - 12 cr)

Plan A

Students must register for 10 credits.

• [CS 8777](#) - Thesis Credits: Master's (1.0 - 24.0 cr)

or Plan B

Students must complete an approved Plan B Project through registration of 4 credits of [CS 8794](#) - Project Credits: Master's. Master's Plan B Projects represent a significant programming research project that often will extend a large assignment within a 5xxx-level or higher course. Speak to the instructors of 5xxx-level or higher courses to see if the course supports Master's Projects.

Take 4 or more credit(s) from the following:

• [CS 8794](#) - Project Credits: Master's (1.0 - 4.0 cr)

Any CS 5xxx or higher courses, subject to approval by the director of graduate studies.

Take 8 or more credit(s) from the following:

• CS 5xxx

• CS 8xxx



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/degrees/grad>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- 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)

Prerequisites for Admission

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

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.

Required Coursework (8 cr)

Take 8 or more credit(s) from the following:

- CS 5xxx
- CS 8xxx

Duluth Campus

Earth Sciences M.S.

D Earth & Environmental Sci

Swenson College of Science and Engineering

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

Contact Information:

Department of Earth and Environmental Sciences, University of Minnesota Duluth, 229 Heller Hall, 1114 Kirby Drive, Duluth, MN 55812 (218-726-7238; fax: 218-726-8275)

Email: <http://www.d.umn.edu/dees/>

Website: <https://scse.d.umn.edu/about/departments-and-programs/earth-environmental-sciences>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- 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 Earth Sciences includes areas of environmental geoscience, economic geology, geophysics, glacial geology and geomorphology, hydrology, hydrogeology, igneous and metamorphic petrology, isotope and aqueous geochemistry, limnogeology, paleoclimatology, planetary geology, sedimentology and stratigraphy, surface processes, and structure-tectonics. Several of these areas are strengthened by collaboration with the Large Lakes Observatory and the Natural Resources Research Institute.

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 BS or BA degree in geology, Earth science, or a related field in engineering, basic science, or mathematics is required.

Other requirements to be completed before admission:

Most candidates will have completed a bachelor's degree in Earth science, environmental science, 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.

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
- 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 15 to 21 major credits, 0 to 6 credits outside the major, and 10 thesis credits. The final exam is oral.



Plan B: Plan B requires 25 to 31 major credits and 0 to 6 credits outside the major. The final exam is written. A capstone project is required.

Capstone Project: The capstone project is completed in consultation with the advisor.

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.

Required Course (1 credit)

Take the following course:

[GEOL 8200](#) - Professional Issues in Earth and Environmental Science (1.0 cr)

Major Electives (14 to 24 credits)

Plan A students select at least 14 credits, and Plan B students select at least 24 credits from the following in consultation with the advisor:

- GEOL 4xxx
- GEOL 5xxx
- GEOL 8xxx
- ESCI 4xxx
- ESCI 5xxx
- ESCI 8xxx
- GEOL 4xxx
- GEOL 5xxx
- GEOL 8xxx

Additional Coursework (0 to 6 credits)

Select additional credits, as needed to meet minimum course credit requirements, in consultation with the advisor.

Plan Options

Plan A

Thesis Credits

Plan A students must take 10 masters thesis credits.

[GEOL 8777](#) - Thesis Credit: Master's (1.0 - 10.0 cr)

Duluth Campus

Electrical Engineering M.S.E.E.

Electrical Engineering

Swenson College of Science and Engineering

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

Contact Information:

EE Graduate Program, 271 MWAH, 1023 University Drive, Duluth, MN 55812 (218-726-6830; fax: 218-726-7267)

Email: umnee@d.umn.edu

Website: <http://www.d.umn.edu/ee/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Science in Electrical 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 master of science in electrical engineering (MSEE) combines scholarship and research in a program oriented toward students and engineering practitioners in the private and public sectors who are interested in advanced coursework and applied research. The program requires 31 credits of graduate coursework and research with focus on the departmental faculty's research areas of control systems, communications, signal processing, VLSI, nanoscale optoelectronics and photovoltaics, biomedical engineering, and intelligent transportation systems.

Undergraduate students in the Electrical Engineering program who are interested in pursuing the Master of Electrical Engineering at UMD may apply for admission to the Integrated Undergraduate/Graduate (IUG) Program. Students in the IUG Program start their graduate coursework prior to the completion of their undergraduate degree and may apply up to 9 credits of coursework to both their undergraduate B.S.E.E. and graduate M.S.E.E. degrees. Admission to the IU Program is limited to highly qualified upper division undergraduates.

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 electrical engineering, computer engineering, or computer science. Applicants from related majors may apply but may be required to take additional undergraduate courses.

Special Application Requirements:

The earned bachelors degree required may be waived only for current students in the Electrical Engineering B.S.E.E. program and who are applying through the Integrated Undergraduate/Graduate (IUG) option.

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
- 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](#)(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 15 to 21 major credits, 0 to 6 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 25 to 31 major credits and 0 to 6 credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: The Plan B project is for those students or practicing engineers who wish to have a hands-on learning experience solving technical problems, preferably by teaming up with an industrial counterpart. Plan B students are required to take a minimum of 1 and a maximum of 3 project credits.

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 semester must be completed before filing a Degree Program Form.

The master of science in electrical engineering (MSEE) degree requires 31 semester credits. The program offers two degree plans, plan A and plan B. Plan A is research oriented and it requires students to complete a research thesis (10 credits) and additional coursework. Plan B is coursework oriented with a project (1–3 credits) as the research component. For both thesis research and project research, a student is expected to identify a research adviser during the first two semesters in the program.

Plan A: Thesis Option

Students must complete a minimum of 31 semester credits including 10 thesis credits and 21 coursework credits. Plan A students must register for 10 thesis (EE 8777) credits, and write and defend a thesis on original research. Students may take up to 6 credits from graduate programs in related fields outside of EE. All courses must be 4xxx or above; a maximum of 6 credits in courses at 4xxx level is allowed, a minimum of 3 credits in courses at 8xxx is required; excluding EE 8001 and EE 8777.

Plan B: Project Option

Students must complete a minimum of 31 semester credits including project credits. Plan B students must register for at least 1 project credit (EE 8222), and write and defend a project report. Students may take up to 6 credits from graduate programs in related fields outside of EE. All courses must be 4xxx or above; a maximum of 6 credits in courses at 4xxx level is allowed, a minimum of 3 credits in courses at 8xxx is required, excluding EE 8001 and EE 8222.

Plan A or Plan B

Plan A

Take exactly 1 credit(s) from the following:

- EE 8001 - Graduate Professional Communication Seminar (1.0 cr)

Take exactly 10 credit(s) from the following:

- EE 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

Take 20 or more credit(s) from the following:

- EE 4305 - Computer Architecture (4.0 cr)
- EE 4311 - Design of Very Large-Scale Integrated Circuits (3.0 cr)
- EE 4321 - Computer Networks (3.0 cr)
- EE 4341 - Digital Systems (4.0 cr)
- EE 4501 - Power Systems (4.0 cr)
- EE 4611 - Introduction to Solid-State Semiconductors (3.0 cr)
- EE 4896 - Co-op in Electrical Engineering (1.0 cr)
- EE 5151 - Digital Control System Design (3.0 cr)
- EE 5315 - Multiprocessor-Based System Design (3.0 cr)
- EE 5477 - Antennas and Transmission Lines (3.0 cr)
- EE 5479 - Antennas and Transmission Lines Laboratory (1.0 cr)
- EE 5501 - Energy Conversion System (3.0 cr)
- EE 5522 - Power Electronics I (3.0 cr)
- EE 5533 - Grid- Resiliency, Efficiency and Technology (3.0 cr)
- EE 5611 - Microelectronics Technology (3.0 cr)
- EE 5741 - Digital Signal Processing (3.0 cr)



- EE 5742 - Pattern Recognition and Machine Learning (4.0 cr)
- EE 5745 - Medical Imaging (3.0 cr)
- EE 5765 - Modern Communication (4.0 cr)
- EE 5801 - Introduction to Artificial Neural Networks (3.0 cr)
- EE 5995 - Special Topics: (Various Titles to be Assigned) (1.0 - 3.0 cr)
- EE 8151 - Optimal Control Systems (3.0 cr)
- EE 8741 - Digital Image Processing (4.0 cr)
- EE 8765 - Digital Communications (3.0 cr)

or **Plan B**

Take exactly 1 credit(s) from the following:

- EE 8001 - Graduate Professional Communication Seminar (1.0 cr)

Take 1 - 3 credit(s) from the following:

- EE 8222 - Master's Plan B Research and Design Project (1.0 - 3.0 cr)

Take 27 - 29 credit(s) from the following:

- EE 4305 - Computer Architecture (4.0 cr)
- EE 4311 - Design of Very Large-Scale Integrated Circuits (3.0 cr)
- EE 4321 - Computer Networks (3.0 cr)
- EE 4341 - Digital Systems (4.0 cr)
- EE 4501 - Power Systems (4.0 cr)
- EE 4611 - Introduction to Solid-State Semiconductors (3.0 cr)
- EE 4896 - Co-op in Electrical Engineering (1.0 cr)
- EE 5151 - Digital Control System Design (3.0 cr)
- EE 5315 - Multiprocessor-Based System Design (3.0 cr)
- EE 5351 - Introduction to Robotics and Mobile Robot Control Architectures (3.0 cr)
- EE 5477 - Antennas and Transmission Lines (3.0 cr)
- EE 5501 - Energy Conversion System (3.0 cr)
- EE 5522 - Power Electronics I (3.0 cr)
- EE 5533 - Grid- Resiliency, Efficiency and Technology (3.0 cr)
- EE 5611 - Microelectronics Technology (3.0 cr)
- EE 5741 - Digital Signal Processing (3.0 cr)
- EE 5742 - Pattern Recognition and Machine Learning (4.0 cr)
- EE 5745 - Medical Imaging (3.0 cr)
- EE 5765 - Modern Communication (4.0 cr)
- EE 5801 - Introduction to Artificial Neural Networks (3.0 cr)
- EE 5995 - Special Topics: (Various Titles to be Assigned) (1.0 - 3.0 cr)
- EE 8151 - Optimal Control Systems (3.0 cr)
- EE 8741 - Digital Image Processing (4.0 cr)
- EE 8765 - Digital Communications (3.0 cr)



Duluth Campus

Electrical Engineering Minor

Electrical Engineering

Swenson College of Science and Engineering

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

Contact Information:

EE Graduate Program, 271 MWAH, 1023 University Drive, Duluth, MN 55812 (218-726-6830; fax: 218-726-7267)

Email: umdee@d.umn.edu

Website: <http://www.d.umn.edu/ee/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- 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 in Electrical Engineering (M.S.E.E) combines scholarship and research in a program oriented toward students and engineering practitioners in the private and public sectors who are interested in advanced coursework and applied research. The minor allows students to get exposed to advanced sciences and technologies in electrical 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.

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.

1. Individual programs must be approved by the director of graduate studies of electrical engineering program.

Required (6 cr)

Take 6 or more credit(s) from the following:

- EE 5xxx
- EE 8xxx

Duluth Campus

Environmental Health and Safety M.Env.Hlth.Sa.

UMD Mechanical/Industrial Engineering

Swenson College of Science and Engineering

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

Contact Information:

MEHS Director of Graduate Studies, 105 Voss-Kovach Hall, 1305 Ordean Court, Duluth, MN 55812 (218-726-7981)

Email: mehs@d.umn.edu

Website: <http://www.d.umn.edu/mehs>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 33
- This program requires 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's of environmental health and safety (MEHS) program prepares its graduates for professional careers in environmental health and safety--encompassing occupational safety, industrial hygiene, ergonomics, risk management, and environmental health. The program strives not only to provide academic-based knowledge, but also the technical and practical skills necessary to be a successful EHS professional and the coursework covers a broad range of EHS topics.

Ultimately, the mission of the MEHS 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 EHS-related field. All degrees, must have been earned at an accredited college or university.

Other requirements to be completed before admission:

Applicants must have earned a grade of C or better at the collegiate level in the following introductory coursework: chemistry with a lab component, and statistics.

Applicants must provide three letters of recommendation, one of which should be from an instructor or professor in the department awarding the student's baccalaureate degree. Recommendations should address either the student's academic ability or readiness to pursue a professional graduate degree in EHS, if not both. Recommendations from family members will not be accepted.

Preferred applicants will have work experience related to EHS and have completed collegiate-level coursework in introductory physics, human biology and/or physiology, and psychology.

Special Application Requirements:

Applicants must also provide:

- Personal Statement describing your interest in pursuing a MEHS degree and why you would work well in the EHS profession.
- Transcript(s) indicating completion of a baccalaureate degree program and grades obtained in the prerequisite courses
- Resume or CV

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
- 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 33 major credits and 0 credits outside the major. There is no final exam. A capstone project is required.

Capstone Project: The Plan C capstone internship project requires a student to apply knowledge and skills acquired from the MEHS coursework and demonstrate their mastery of EHS-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, government, or other organization having an established safety project or in the process of implementing a safety project. A daily work log, written evaluation by the internship supervisor, a two-page executive summary of the project and an oral presentation are 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.

At least two semesters in residence are required.

Core Requirements (27 cr)

- [SAFE 6002](#) - Regulatory Standards and Hazard Control (3.0 cr)
- [SAFE 6011](#) - System Safety and Loss Control Techniques (3.0 cr)
- [SAFE 6012](#) - Risk Management and Workers' Compensation (3.0 cr)
- [SAFE 6101](#) - Principles of Industrial Hygiene (3.0 cr)
- [SAFE 6102](#) - Advanced Industrial Hygiene and Health Physics (3.0 cr)
- [SAFE 6201](#) - Fire Prevention and Emergency Preparedness (3.0 cr)
- [SAFE 6302](#) - Occupational Ergonomics and Injury Management (3.0 cr)
- [SAFE 6401](#) - Environmental Safety and Legal Implications (3.0 cr)
- [SAFE 6821](#) - Organization and Administration of Safety Programs (3.0 cr)

Electives (3 cr)

Take 3 or more credit(s) from the following:

- [SAFE 6051](#) - Construction Safety (3.0 cr)
- [SAFE 6211](#) - Transportation Safety (3.0 cr)
- [SAFE 6212](#) - Noise Control Engineering (3.0 cr)
- [SAFE 6213](#) - Principles of Ventilation and Indoor Air Quality (3.0 cr)
- [SAFE 6291](#) - Independent Study in Industrial Safety (1.0 - 3.0 cr)
- [SAFE 6295](#) - Special Topics: (Various Titles to be Assigned) (1.0 - 3.0 cr)
- [SAFE 6301](#) - Occupational Biomechanics and Work Physiology (3.0 cr)

Internship (3 cr)

Register for the 3-credit internship no later than 12 months after completing the program coursework.

- [SAFE 6997](#) - Internship in Environmental Health and Safety (3.0 cr)



Duluth Campus

Geological Sciences Minor

D Earth & Environmental Sci

Swenson College of Science and Engineering

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

Contact Information:

Department of Earth and Environmental Sciences, University of Minnesota Duluth, 229 Heller Hall, 1114 Kirby Drive, Duluth, MN 55812 (218-726-7239; fax: 218-726-7218)

Email: dees@d.umn.edu

Website: <http://www.d.umn.edu/dees/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- 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)

Prerequisites for Admission

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 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.

Required Coursework (6 cr)

Take 6 or more credit(s) from the following:

- GEOL 5xxx
- GEOL 8xxx

Duluth Campus

Integrated Biosciences M.S

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: Master's
- Requirements for this program are current for Fall 2020
- 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.

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

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

Approved graduate course credits from the University of Minnesota Duluth Integrated Biosciences MS may be counted in common with the University of Minnesota Twin Cities campus Integrated Biosciences doctoral program (<http://policy.umn.edu/education/gradcreditdegree> see 2.b.).

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.

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
- 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 20 major credits, up to null 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.

In addition to coursework and thesis credits, students must conduct original research, and write and successfully defend a thesis.

Required Coursework (11 cr)

- IBS 8011 - Integrated Biological Systems I (2.0 cr)
- IBS 8012 - Integrated Evolutionary Processes (2.0 cr)
- IBS 8013 - Integrated Biological Systems II (2.0 cr)
- IBS 8030 - IBS Research Club (1.0 cr)
- IBS 8099 - The Biological Practitioner (1.0 cr)
- STAT 4060 - Introduction to Biostatistics (3.0 cr)
 - or STAT 5411 - Analysis of Variance (3.0 cr)
 - or STAT 5511 - Regression Analysis (3.0 cr)

Thesis (10 cr)

Must be taken for 10 credits.

- IBS 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

Electives (9 cr)

Elective coursework outside of IBS courses may be taken with prior approval from the Director of Graduate Studies in consultation with the student's advisor.

Take 9 or more credit(s) from the following:

- IBS 8020 - Integrated Biosciences Colloquia (1.0 cr)
- IBS 8094 - Rotations (1.0 cr)
- IBS 8101 - Cellular Biochemistry (3.0 cr)
- IBS 8102 - Cell, Molecular and Developmental Biology (3.0 cr)
- IBS 8103 - Comparative Animal Physiology (3.0 cr)
- IBS 8201 - Ecological Processes (2.0 cr)
- IBS 8202 - Chemical Biology (3.0 cr)
- IBS 8203 - Methods in Molecular Biosciences (2.0 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 2020
- 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 three areas of emphasis: cell, molecular, and physiological (CMP) biology emphasis, chemical biology (CB) emphasis, and ecology, organismal, and population (EOP) biology emphasis.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

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.

Course Group 0

IBS Masters Minor

Take 6 or more credit(s) from the following:

- IBS 8xxx

or IBS Doctoral Minor

Take 12 or more credit(s) from the following:

- IBS 8xxx

Duluth Campus

Master of 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 2020
- 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 UMD disciplines of Civil Engineering, Chemical Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering or Mining and Minerals Processing.

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.

Other requirements to be completed before admission:

1. Completed an undergraduate degree in an engineering program, or upon approval by the SCSE MEng Director of Graduate Studies, in a related discipline, e.g. computer science, geology, physics etc.
2. The MEng prefers an undergraduate grade point average (GPA) of 3.00 (on a 4.0 scale) for admission. This preferred performance minimum of 3.0/4.0 must be from an ABET accredited program or equivalent. Industrial experience and professional licensure will be considered for applicants with a grade point less than the preferred minimum.
3. Two letters of recommendation: academic and/or professional references.
4. For international applicants whose native language is not English, a TOEFL score preferred performance minimum is 79 on the internet based test.
5. The GRE score is recommended but not 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

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.

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.

Major Plan Department Requirements (12 cr)

In consultation with their Departmental Advisor, students may choose to include one or more 8XXX courses in their Program of Study. It should be noted that even though there are no requirements for 8XXX courses, MEng students who meet the course prerequisites for 8xxx courses in Electrical Engineering, Engineering Management, Geologic Sciences, and Computer Science will be encouraged to include these courses in their degree program. Selected 4xxx courses may apply.

Take 12 or more credit(s) from the following:

- CE 5xxx
- CE 8xxx
- CHE 5xxx
- CHE 8xxx
- EE 5xxx
- EE 8xxx
- IE 5xxx
- IE 8xxx
- ME 5xxx
- ME 8xxx

Engineering Course Project (3 - 6 cr)

Project within the Major Plan Department to be arranged by the Departmental Advisor and student.

Take 3 - 6 credit(s) from the following:

- [CE 5555](#) - Project Credits: Master of Engineering (Civil) (3.0 - 6.0 cr)
- [CHE 5555](#) - Project Credits: MEng - Chemical Engineering (3.0 - 6.0 cr)

Other Engineering (6 - 12 cr)

Courses selected in collaboration with the Departmental Advisor; selected 4xxx level courses may apply with approval.

Take 6 - 12 credit(s) from the following:

- CE 5xxx
- CE 8xxx
- CHE 5xxx
- CHE 8xxx
- EE 5xxx
- EE 8xxx
- IE 5xxx
- IE 8xxx
- ME 5xxx
- ME 8xxx

Non Engineering (0 - 3 cr)

In order to reach the 30 minimum required credits, elective credits can be from a non-engineering approved graduate course list. Courses must be selected in collaboration with the Departmental Advisor.

Duluth Campus

Mathematical Sciences M.S.

Mathematics & Statistics

Swenson College of Science and Engineering

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

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 36
- 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.

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. A Statistics track is available to interested students.

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.

Special Application Requirements:

Application deadline is January 15.

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
- IELTS
 - Total Score: 6.5
 - Reading Score: 6.5
 - Writing 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 26 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 36 major credits and 0 credits outside the major. The final exam is oral. A capstone project is required.

Capstone Project: The Plan B project is presented to the department in a seminar or colloquium, and prepared for publication as a departmental technical report.

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.

All students must complete at least 26 MATH or STAT course credits; at least 15 of which must be MATH course credits for those students not pursuing the Statistics track.

Theoretical Core (11 to 14 credits)

Students pursuing the Statistics track are exempt from MATH 5371, and must complete 11 credits from the following theoretical core courses. All other students must select 14 credits. Courses from the Core Electives can be substituted for theoretical core coursework with advisor and director of graduate studies approval.

[MATH 5201](#) - Real Variables (4.0 cr)

[MATH 5327](#) - Advanced Linear Algebra (3.0 cr)

[MATH 5371](#) - Abstract Algebra I (3.0 cr)

[STAT 5571](#) - Probability (4.0 cr)

Core Electives

Applied Analysis

[MATH 5202](#) - Applied Functional Analysis (3.0 cr)

[MATH 5260](#) - Dynamical Systems (3.0 cr)

[MATH 5270](#) - Modeling with Dynamical Systems (3.0 cr)

[MATH 5280](#) - Partial Differential Equations (3.0 cr)

[MATH 5810](#) - Linear Programming (3.0 cr)

[MATH 8201](#) - Real Analysis (3.0 cr)

Algebra and Discrete Math

[MATH 5330](#) - Theory of Numbers (3.0 cr)

[MATH 5347](#) - Applied Algebra and Cryptology (3.0 cr)

[MATH 5365](#) - Graph Theory (3.0 cr)

[MATH 5366](#) - Enumerative Combinatorics (3.0 cr)

[MATH 5372](#) - Abstract Algebra II (3.0 cr)

Probability and Statistics

[STAT 5411](#) - Analysis of Variance (3.0 cr)

[STAT 5511](#) - Regression Analysis (3.0 cr)

[STAT 5515](#) - Multivariate Statistics (3.0 cr)

[STAT 5521](#) - Applied Time Series Analysis (3.0 cr)

[STAT 5531](#) - Probability Models (4.0 cr)

[STAT 5572](#) - Statistical Inference (4.0 cr)

[STAT 8611](#) - Linear Models (3.0 cr)

Graduate Seminar (1 cr)

Take the following course:

[MATH 8980](#) - Graduate Seminar (1.0 cr)

Graduate Colloquium and Comprehensive Exam (1 cr)

Take the following:

[MATH 8990](#) - Graduate Colloquium (0.5 cr)

[MATH 8991](#) - Comprehensive Exam (0.5 cr)

Computation (0 to 3 credits)

Select at least 3 credits from the following in consultation with the advisor. Students pursuing the Statistics track are exempt from this requirement.

[MATH 5233](#) - Mathematical Foundations of Bioinformatics (3.0 cr)

[MATH 5830](#) - Numerical Analysis: Approximation and Quadrature (4.0 cr)

[MATH 5840](#) - Numerical Analysis: Systems and Optimization (4.0 cr)

[MATH 5850](#) - Numerical Differential Equations (4.0 cr)



[STAT 5411](#) - Analysis of Variance (3.0 cr)
[STAT 5511](#) - Regression Analysis (3.0 cr)
[STAT 5515](#) - Multivariate Statistics (3.0 cr)
[STAT 5521](#) - Applied Time Series Analysis (3.0 cr)

Electives

Select elective credits as needed, in consultation with the director of graduate studies, to complete minimum credit requirements including the minimum number of MATH or STAT credits. Selections can include courses outside the major.

Plan Options

Plan A

Thesis Credits

Take 10 master's thesis credits, in consultation with the advisor, after submission of the Graduate Degree Plan.

[MATH 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

Plan B

Project Credits (4 credits)

Take 4 project credits from the following, in consultation with the advisor, after submission of the Graduate Degree Plan. Students pursuing the Statistics track should take [STAT 8774](#).

[MATH 8774](#) - Plan B Final Project Research (1.0 - 4.0 cr)

or [STAT 8774](#) - Plan B Final Project Research (1.0 - 4.0 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.

Statistics

Theoretical Core (4 credits)

Take the following course:

[STAT 5572](#) - Statistical Inference (4.0 cr)

Statistics Electives (9 credits)

Take at least 9 credits from the following in consultation with the advisor:

[STAT 5411](#) - Analysis of Variance (3.0 cr)

[STAT 5511](#) - Regression Analysis (3.0 cr)

[STAT 5515](#) - Multivariate Statistics (3.0 cr)

[STAT 5521](#) - Applied Time Series Analysis (3.0 cr)

[STAT 5531](#) - Probability Models (4.0 cr)

[STAT 8611](#) - Linear Models (3.0 cr)

Duluth Campus

Mathematical Sciences 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 2020
- 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 in other fields that use mathematics or statistics.

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.

Enrollment in any MS or MA program at UMD and sufficiently strong background in mathematics and/or statistics.

Other requirements to be completed before admission:

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.

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

Required Coursework (6 cr)

Take 6 or more credit(s) from the following:

- MATH 5xxx
- MATH 8xxx
- STAT 5xxx



•STAT 8xxx

Duluth Campus

Mechanical Engineering M.S.M.E.

UMD Mechanical/Industrial Engineering

Swenson College of Science and Engineering

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

Contact Information:

Email: MSME@d.umn.edu

Website: https://z.umn.edu/MSME_UMD

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science in Mechanical 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 MSME combines professional engineering coursework with research in a field within mechanical engineering. Focus areas include thermo/fluids, materials/manufacturing, dynamics/control, and mechanical design and analysis. There are two options for completing an MSME degree: Plan A (thesis option), and Plan B (project option). Plan A includes writing and defending a thesis which requires in-depth research equivalent to 10 credits out of 30 total credits. Plan B includes a capstone project equivalent to 3 credits out of 30 total credits and targets practicing engineers.

Undergraduate students in the Mechanical Engineering program who are interested in pursuing the Master of Mechanical Engineering at UMD may apply for admission to the Integrated Undergraduate/Graduate (IUG) Program. Students in the IUG Program start their graduate coursework prior to the completion of their undergraduate degree and may apply up to 9 credits of coursework to both their undergraduate B.S.M.E. and graduate M.S.M.E. degrees. Admission to the IUG Program is limited to highly qualified upper-division undergraduates.

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 BS degree in mechanical engineering or admission to integrated undergrad/grad program at UMD. Other undergraduate degrees may be accepted; additional coursework may be required.

Graduate Record Examination (GRE) scores are not required for admission, but these scores will be taken into account if they are provided.

Other requirements to be completed before admission:

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

Special Application Requirements:

The earned bachelors degree required may be waived only for current students in the B.S.M.E. program and who are applying through the Integrated Undergraduate/Graduate (IUG) option.

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

- TOEFL
 - Internet Based - Total Score: 79
- 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 20 major credits, up to null credits outside the major, and 10 thesis credits. The final exam is written and oral.

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

Capstone Project: Capstone project is 3 credits.

This program may not be completed with a minor.

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

In consultation with the advisor and director of graduate studies, a maximum of 6 4xxx-level credits, a maximum of 12 transfer credits, and a maximum of 6 credits from fields outside mechanical engineering will be considered.

Course Requirements

Plan A

Core Courses

- ME 5110 - Analytic Techniques in Mechanical Engineering (3.0 cr)
- ME 5120 - Advanced Dynamics and Control (3.0 cr)
- ME 5210 - Advanced Thermal Fluid Sciences (3.0 cr)
- ME 5220 - Advanced Mechanics of Materials (3.0 cr)

Electives

Take 6 or more credit(s) from the following:

- ME 4112 - Heat and Mass Transfer (3.0 cr)
- ME 4135 - Robotics and Controls (3.0 cr)
- ME 4145 - CAD/CAM (4.0 cr)
- ME 4175 - Machine Design (3.0 cr)
- ME 4365 - Global Sustainability Experience in Design/Manufacturing in Africa (3.0 cr)
- ME 4375 - Pipeline Engineering (3.0 cr)
- ME 5305 - Computational Fluid Dynamics (3.0 cr)
- ME 5315 - Nondestructive Evaluation of Engineering Materials (3.0 cr)
- ME 5325 - Sustainable Energy System (3.0 cr)
- ME 5345 - Smart Materials and Structures (3.0 cr)
- ME 5355 - Gas Turbines (3.0 cr)

Graduate Seminar

Take 2 or more credit(s) from the following:

- ME 8993 - Graduate Seminar (1.0 cr)

Thesis Credits

Take 10 or more credit(s) from the following:

- ME 8777 - Thesis Credits: Master's (1.0 - 10.0 cr)

or **Plan B**

Core Courses

- ME 5110 - Analytic Techniques in Mechanical Engineering (3.0 cr)
- ME 5120 - Advanced Dynamics and Control (3.0 cr)
- ME 5210 - Advanced Thermal Fluid Sciences (3.0 cr)
- ME 5220 - Advanced Mechanics of Materials (3.0 cr)

Electives

Take 15 or more credit(s) from the following:

Take at most 6 credit(s) from the following:

- ME 4112 - Heat and Mass Transfer (3.0 cr)
- ME 4135 - Robotics and Controls (3.0 cr)
- ME 4145 - CAD/CAM (4.0 cr)
- ME 4175 - Machine Design (3.0 cr)
- ME 4365 - Global Sustainability Experience in Design/Manufacturing in Africa (3.0 cr)
- ME 4375 - Pipeline Engineering (3.0 cr)
- Take 9 or more credit(s) from the following:



- ME 5305 - Computational Fluid Dynamics (3.0 cr)
- ME 5315 - Nondestructive Evaluation of Engineering Materials (3.0 cr)
- ME 5325 - Sustainable Energy System (3.0 cr)
- ME 5335 - Introduction to Finite Element Analysis (3.0 cr)
- ME 5345 - Smart Materials and Structures (3.0 cr)
- ME 5355 - Gas Turbines (3.0 cr)

Capstone Project

- ME 8310 - Mechanical Engineering Capstone Project (3.0 cr)

Duluth Campus

Physics M.S.

UMD-Physics & Astronomy

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/physics/grad/>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- 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 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.

Other requirements to be completed before admission:

Three letters of recommendation are required. Applications that are completed by April 1 will receive full consideration

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
- IELTS
 - Total Score: 6.5
 - Reading Score: 6.5
 - Writing 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.

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.

Core Requirements (11 cr)

PHYS 5090 must be taken twice for a total of 2 credits.

[PHYS 5090](#) - Physics Seminar (1.0 cr)

[PHYS 5501](#) - Advanced Classical Mechanics (3.0 cr)

[PHYS 5511](#) - Electrodynamics (3.0 cr)

[PHYS 5521](#) - Quantum Mechanics I (3.0 cr)

Methods Course (3 cr)

[PHYS 5052](#) - Computational Methods in Physics (3.0 cr)

or [PHYS 5053](#) - Data Analysis Methods in Physics (3.0 cr)

or [PHYS 5061](#) - Experimental Methods (3.0 cr)

Electives, including Related Field (6 cr)

At least 6 credits in courses eligible for graduate credit in physics or related fields, or a minor in a related field.

Choose one of Plan A or Plan B

Minimum of 10 credits, as follows:

Plan A:

Minimum 10 credits.

[PHYS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

or **Plan B:**

Courses may include 4000-level courses if appropriate and approved for graduate credit and may be drawn from related fields outside of physics. The overall plan of study and selection of specific elective courses must form a cohesive program and be approved by the DGS and the adviser.

Requires a minimum of 120 hours of total effort, and preparation of a written report for each project.

Duluth Campus

Physics Minor

UMD-Physics & Astronomy

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/physics/grad/>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- 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)

Prerequisites for Admission

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

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.

Required Courses (6 cr)

No more than 1 credit can be from PHYS 5090.

Take 6 or more credit(s) from the following:

- PHYS 5xxx
- PHYS 8xxx

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 2020
- Length of program in credits: 50
- 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 three areas of emphasis: cell, molecular, and physiological (CMP) biology emphasis, chemical biology (CB) emphasis, and ecology, organismal, and population (EOP) biology emphasis.

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.

Other requirements to be completed before admission:

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.

Additional recommended courses for students in the chemical biology (CB) emphasis include one year of organic chemistry, plus one course in biochemistry and cell biology.

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
- 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

26 credits are required in 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 University regulations and all students will be required to pass the oral examination to continue in the Ph.D. program.

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 University regulations. It will consist of a public seminar presented by the student.

Required Coursework (13 cr)

- IBS 8011 - Integrated Biological Systems I (2.0 cr)
- IBS 8012 - Integrated Evolutionary Processes (2.0 cr)
- IBS 8013 - Integrated Biological Systems II (2.0 cr)
- IBS 8030 - IBS Research Club (1.0 cr)
- IBS 8099 - The Biological Practitioner (1.0 cr)
- STAT 4060 - Introduction to Biostatistics (3.0 cr)
 - or STAT 5411 - Analysis of Variance (3.0 cr)
 - or STAT 5511 - Regression Analysis (3.0 cr)
- IBS 8993 - Integrated Biosciences Graduate Seminar (2.0 cr)

Thesis (24 cr)

Must be taken for 24 credits

- IBS 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

Electives (13 cr)

Take 13 or more credit(s) from the following:

- IBS 8020 - Integrated Biosciences Colloquia (1.0 cr)
- IBS 8094 - Rotations (1.0 cr)
- IBS 8101 - Cellular Biochemistry (3.0 cr)
- IBS 8102 - Cell, Molecular and Developmental Biology (3.0 cr)
- IBS 8103 - Comparative Animal Physiology (3.0 cr)
- IBS 8201 - Ecological Processes (2.0 cr)
- IBS 8202 - Chemical Biology (3.0 cr)
- IBS 8203 - Methods in Molecular Biosciences (2.0 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/degrees-courses/degree-requirements>

- Program Type: Master's
- Requirements for this program are current for Fall 2020
- Length of program in credits: 30 to 32
- 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 interest: aquatic biology, environmental chemistry, hydrologic science, limnology, water management technology, water policy, water quality, and watershed science and management.

A limnology and oceanography track is also offered. Approximately 50 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; Chemistry; Civil Engineering; Earth Sciences; Ecology, Evolution, and Behavior; Entomology; Environmental and Occupational Health; Fisheries, Wildlife, and Conservation Biology; Forest Resources; Horticultural Science; Landscape Architecture; 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; Geological Sciences; Physics; 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.

Other requirements to be completed before admission:

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 advisor are important criteria for admission to the program.

Special Application Requirements:

Applicants must submit three letters of recommendation via the University's application system. 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. Students may be admitted any semester but are strongly encouraged to submit their application by December 1 for fall semester admission. More specific application instruction can be found on the program website: <https://wrs.umn.edu/prospective-students/admissions-info>.

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
- 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 22 major credits, 0 credits outside the major, and 10 thesis credits. The final exam is oral.

Plan B: Plan B requires 30 major credits and 0 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 advisor. The Plan B option is well suited to students who have little undergraduate course work 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.

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

Courses offered on both the A/F and S/N grade basis must be taken A/F.

Students with WRS-equivalent core courses taken as undergraduates may substitute other classes to meet program requirements, with advisor approval.

Core Courses (13 credits)

Select at least one course from the following in consultation with the advisor:

Hydrology (3 credits)

- CE 4228 - Watershed Engineering (3.0 cr)
- or GEOG 4446 - Water Processes and Management (3.0 cr)
- or GEOL 4201 - Introduction to Watershed Hydrology (3.0 cr)
- or GEOL 5250 - Hydrogeology (4.0 cr)
- or LIM 5101 - Physical Limnology (3.0 cr)

Environmental/Water Chemistry (3 credits)

Select at least one course from the following in consultation with the advisor:

- CE 5241 - Water Chemistry (3.0 cr)
- or CHEM 5150 - Organic and Stable Isotope Biogeochemistry (3.0 cr)

or [LIM 5102](#) - Chemical Limnology (3.0 cr)

Limnology (3 credits)

Select at least one course from the following in consultation with the advisor:

[BIOL 5833](#) - Stream Ecology (3.0 cr)

or [BIOL 5861](#) - Lake Ecology (3.0 cr)

or [GEOL 5103](#) - Geological Paleolimnology (3.0 cr)

or [LIM 5010](#) - Integrated Approaches to the Study of Inland Waters (3.0 cr)

or [LIM 5103](#) - Geological Paleolimnology (3.0 cr)

Water Resources Policy (3 credits)

Take the following course:

[WRS 5101](#) - Water Policy (3.0 cr)

Water Seminar Series (.5 credits)

Take the following course:

[WRS 8100](#) - Interdisciplinary Seminar in Water Resources (0.5 - 3.0 cr)

Ethics and Responsible Conduct in Research (.5 credits)

Take the following course:

[WRS 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

WRS Electives (9 to 17 credits)

Plan A students select 9 credits, and Plan B students select 17 credits from the following, in consultation with the advisor. Plan A students cannot apply WRS 8095 to this requirement.

[BIOL 4761](#) - Ichthyology (3.0 cr)

or [BIOL 5201](#) - Leverage bioinformatic tools to manage big data and answer primary biology questions (3.0 cr)

or [BIOL 5801](#) - Microbial Ecology (2.0 cr)

or [BIOL 5805](#) - Fisheries Ecology and Management (3.0 cr)

or [BIOL 5808](#) - Landscape Ecology: Theory and Application (3.0 cr)

or [BIOL 5809](#) - Ecological Statistics (3.0 cr)

or [BIOL 5833](#) - Stream Ecology (3.0 cr)

or [BIOL 5861](#) - Lake Ecology (3.0 cr)

or [BIOL 5863](#) - Ecosystems Ecology (3.0 cr)

or [BIOL 5870](#) - Wetland Ecology (3.0 cr)

or [CE 4213](#) - Open Channel Hydraulics (3.0 cr)

or [CE 4215](#) - Hydraulic Design (3.0 cr)

or [CE 4228](#) - Watershed Engineering (3.0 cr)

or [CE 5203](#) - Stream Crossing and Culvert Design (3.0 cr)

or [CE 5216](#) - Applications in Environmental Modeling (3.0 cr)

or [CE 5237](#) - Water Quality Engineering (3.0 cr)

or [CE 5241](#) - Water Chemistry (3.0 cr)

or [CE 5246](#) - Environmental Remediation Technologies (3.0 cr)

or [CHEM 5150](#) - Organic and Stable Isotope Biogeochemistry (3.0 cr)

or [ESCI 5201](#) - Introduction to Watershed Hydrology (3.0 cr)

or [GEOG 4446](#) - Water Processes and Management (3.0 cr)

or [GEOL 4201](#) - Introduction to Watershed Hydrology (3.0 cr)

or [GEOL 5103](#) - Geological Paleolimnology (3.0 cr)

or [GEOL 5210](#) - Glacial and Quaternary Geology (4.0 cr)

or [GEOL 5220](#) - Advances in Paleoclimatology (3.0 cr)

or [GEOL 5250](#) - Hydrogeology (4.0 cr)

or [GEOL 5260](#) - Fluvial Geomorphology (4.0 cr)

or [GEOL 5601](#) - Introduction to Stream Restoration (3.0 cr)

or [GEOL 5603](#) - Stream Crossing Design (2.0 cr)

or [GEOL 8602](#) - Stream Restoration Practice (2.0 cr)

or [GIS 4565](#) - Geographic Information Science Intensive: Theory, Analysis, and Applications (4.0 cr)

or [GIS 5572](#) - Environmental Application of GIS (4.0 cr)

or [LIM 5010](#) - Integrated Approaches to the Study of Inland Waters (3.0 cr)

or [LIM 5011](#) - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters (2.0 cr)

or [LIM 5012](#) - Integrated Approaches to the Study of Inland Waters II (3.0 cr)

or [LIM 5013](#) - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters II (2.0 cr)

or [LIM 5101](#) - Physical Limnology (3.0 cr)

or [LIM 5102](#) - Chemical Limnology (3.0 cr)

or [LIM 5103](#) - Geological Paleolimnology (3.0 cr)

or [LIM 5104](#) - Geochemical, Physical, and Biological processes in Aquatic Sediments (2.0 cr)

or [LIM 5105](#) - Research Frontiers and New Directions in Limnology and Environmental Science (1.0 cr)

or [PHYS 5541](#) - Fluid Dynamics (3.0 cr)

or [WRS 5050](#) - Special Topics in Water Resources Science (1.0 - 3.0 cr)

or [WRS 8095](#) - Plan B Project (3.0 cr)

Plan A

Plan A students take 10 masters thesis credits.

[WRS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 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.

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 the 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 ensure 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 with WRS equivalent coursework taken as undergraduate students may substitute other classes to meet minimum credit requirements.

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

Core Courses (11 cr)

Limnology

[LIM 5010](#) - Integrated Approaches to the Study of Inland Waters (3.0 cr)

[LIM 5011](#) - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters (2.0 cr)

[LIM 5013](#) - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters II (2.0 cr)

Water Policy

[CE 5201](#) - Water Policy (3.0 cr)

Ethics

[WRS 8581](#) - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

Seminar

[WRS 8100](#) - Interdisciplinary Seminar in Water Resources (0.5 - 3.0 cr)

WRS Electives

Plan A students need at least 11 credits from the following list and may not use WRS 8095 as an elective. Plan B students need at least 19 credits from the following list:

[BIOL 4761](#) - Ichthyology (3.0 cr)

or [BIOL 5201](#) - Leverage bioinformatic tools to manage big data and answer primary biology questions (3.0 cr)

or [BIOL 5801](#) - Microbial Ecology (2.0 cr)

or [BIOL 5805](#) - Fisheries Ecology and Management (3.0 cr)

or [BIOL 5808](#) - Landscape Ecology: Theory and Application (3.0 cr)

or [BIOL 5833](#) - Stream Ecology (3.0 cr)

or [BIOL 5861](#) - Lake Ecology (3.0 cr)

or [BIOL 5863](#) - Ecosystems Ecology (3.0 cr)

or [BIOL 5870](#) - Wetland Ecology (3.0 cr)

or [CE 4213](#) - Open Channel Hydraulics (3.0 cr)

or [CE 4215](#) - Hydraulic Design (3.0 cr)

or [CE 4228](#) - Watershed Engineering (3.0 cr)

or [CE 5216](#) - Applications in Environmental Modeling (3.0 cr)

or [CE 5237](#) - Water Quality Engineering (3.0 cr)

or [CE 5241](#) - Water Chemistry (3.0 cr)

or [CE 5246](#) - Environmental Remediation Technologies (3.0 cr)

or [CHEM 5150](#) - Organic and Stable Isotope Biogeochemistry (3.0 cr)

or [GEOG 4446](#) - Water Processes and Management (3.0 cr)

or [GEOL 4201](#) - Introduction to Watershed Hydrology (3.0 cr)

or [GEOL 5103](#) - Geological Paleolimnology (3.0 cr)

or [GEOL 5210](#) - Glacial and Quaternary Geology (4.0 cr)

or [GEOL 5220](#) - Advances in Paleoclimatology (3.0 cr)



- or [GEOL 5250](#) - Hydrogeology (4.0 cr)
- or [GEOL 5260](#) - Fluvial Geomorphology (4.0 cr)
- or [GEOL 5601](#) - Introduction to Stream Restoration (3.0 cr)
- or [GEOL 8602](#) - Stream Restoration Practice (2.0 cr)
- or [GIS 4565](#) - Geographic Information Science Intensive: Theory, Analysis, and Applications (4.0 cr)
- or [GIS 5572](#) - Environmental Application of GIS (4.0 cr)
- or [LIM 5010](#) - Integrated Approaches to the Study of Inland Waters (3.0 cr)
- or [LIM 5011](#) - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters (2.0 cr)
- or [LIM 5012](#) - Integrated Approaches to the Study of Inland Waters II (3.0 cr)
- or [LIM 5013](#) - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters II (2.0 cr)
- or [LIM 5101](#) - Physical Limnology (3.0 cr)
- or [LIM 5102](#) - Chemical Limnology (3.0 cr)
- or [LIM 5103](#) - Geological Paleolimnology (3.0 cr)
- or [LIM 5104](#) - Geochemical, Physical, and Biological processes in Aquatic Sediments (2.0 cr)
- or [LIM 5105](#) - Research Frontiers and New Directions in Limnology and Environmental Science (1.0 cr)
- or [PHYS 5541](#) - Fluid Dynamics (3.0 cr)
- or [WRS 5050](#) - Special Topics in Water Resources Science (1.0 - 3.0 cr)
- or [WRS 8095](#) - Plan B Project (3.0 cr)

Plan A

Register for 10 credits

- [WRS 8777](#) - Thesis Credits: Master's (1.0 - 18.0 cr)

Duluth Campus

Water Resources Science Minor

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/degrees-courses/degree-requirements>

- Program Type: Graduate minor related to major
- Requirements for this program are current for Fall 2020
- 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 MS and PhD 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)

Prerequisites for Admission

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

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.

Required Course (3 cr)

[WRS 5101](#) - Water Policy (3.0 cr)



Minor for Masters or Ph.D.

Minor for Masters

Take 6 or more credit(s) from the following:

- BIOL 5833 - Stream Ecology (3.0 cr)
- BIOL 5861 - Lake Ecology (3.0 cr)
- CE 4228 - Watershed Engineering (3.0 cr)
- CE 5241 - Water Chemistry (3.0 cr)
- CHEM 5150 - Organic and Stable Isotope Biogeochemistry (3.0 cr)
- GEOG 4446 - Water Processes and Management (3.0 cr)
- GEOL 4201 - Introduction to Watershed Hydrology (3.0 cr)
- GEOL 5103 - Geological Paleolimnology (3.0 cr)
- GEOL 5250 - Hydrogeology (4.0 cr)
- LIM 5010 - Integrated Approaches to the Study of Inland Waters (3.0 cr)
- LIM 5101 - Physical Limnology (3.0 cr)
- LIM 5102 - Chemical Limnology (3.0 cr)
- LIM 5103 - Geological Paleolimnology (3.0 cr)

or **Minor for Ph.D.**

Take 9 or more credit(s) from the following:

- BIOL 5833 - Stream Ecology (3.0 cr)
- BIOL 5861 - Lake Ecology (3.0 cr)
- CE 4228 - Watershed Engineering (3.0 cr)
- CE 5241 - Water Chemistry (3.0 cr)
- CHEM 5150 - Organic and Stable Isotope Biogeochemistry (3.0 cr)
- GEOG 4446 - Water Processes and Management (3.0 cr)
- GEOL 4201 - Introduction to Watershed Hydrology (3.0 cr)
- GEOL 5103 - Geological Paleolimnology (3.0 cr)
- GEOL 5250 - Hydrogeology (4.0 cr)
- LIM 5010 - Integrated Approaches to the Study of Inland Waters (3.0 cr)
- LIM 5101 - Physical Limnology (3.0 cr)
- LIM 5102 - Chemical Limnology (3.0 cr)
- LIM 5103 - Geological Paleolimnology (3.0 cr)

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/degrees-courses/degree-requirements>

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- 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 PhD level: aquatic biology, environmental chemistry, hydrologic science, limnology, water management technology, water policy, water quality, and watershed science and management. Approximately 50 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; Chemistry; Civil Engineering; Earth Sciences; Ecology, Evolution, and Behavior; Entomology; Environmental and Occupational Health; Fisheries, Wildlife, and Conservation Biology; Forest Resources; Horticultural Science; Landscape Architecture; 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; Geological Sciences; Physics; 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.

Other requirements to be completed before admission:

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 PhD 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
- 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

24 credits are required in the major.

0 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.

No more than 9 credits at the 4xxx level may apply.

Core Courses (13 cr)

Hydrology

Take 1 or more course(s) from the following:

- [CE 4228](#) - Watershed Engineering (3.0 cr)
- [GEOG 4446](#) - Water Processes and Management (3.0 cr)
- [GEOL 4201](#) - Introduction to Watershed Hydrology (3.0 cr)
- [GEOL 5250](#) - Hydrogeology (4.0 cr)
- [LIM 5101](#) - Physical Limnology (3.0 cr)

Environmental/Water Chemistry

Take 1 or more course(s) from the following:

- [CE 5241](#) - Water Chemistry (3.0 cr)
- [CHEM 5150](#) - Organic and Stable Isotope Biogeochemistry (3.0 cr)

- LIM 5102 - Chemical Limnology (3.0 cr)

Limnology

Take 1 or more course(s) from the following:

- BIOL 5833 - Stream Ecology (3.0 cr)
- BIOL 5861 - Lake Ecology (3.0 cr)
- GEOL 5103 - Geological Paleolimnology (3.0 cr)
- LIM 5101 - Physical Limnology (3.0 cr)
- LIM 5102 - Chemical Limnology (3.0 cr)
- LIM 5103 - Geological Paleolimnology (3.0 cr)

Water Resources Policy

Take 1 or more course(s) from the following:

- WRS 5101 - Water Policy (3.0 cr)

Ethics

- WRS 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

Seminar

- WRS 8100 - Interdisciplinary Seminar in Water Resources (0.5 - 3.0 cr)

Electives (11 cr)

Approved electives to fulfill the required 24 course credits.

Take 11 or more credit(s) from the following:

- BIOL 4761 - Ichthyology (3.0 cr)
- BIOL 5801 - Microbial Ecology (2.0 cr)
- BIOL 5805 - Fisheries Ecology and Management (3.0 cr)
- BIOL 5808 - Landscape Ecology: Theory and Application (3.0 cr)
- BIOL 5833 - Stream Ecology (3.0 cr)
- BIOL 5861 - Lake Ecology (3.0 cr)
- BIOL 5863 - Ecosystems Ecology (3.0 cr)
- BIOL 5870 - Wetland Ecology (3.0 cr)
- CE 4213 - Open Channel Hydraulics (3.0 cr)
- CE 4215 - Hydraulic Design (3.0 cr)
- CE 4228 - Watershed Engineering (3.0 cr)
- CE 5216 - Applications in Environmental Modeling (3.0 cr)
- CE 5237 - Water Quality Engineering (3.0 cr)
- CE 5241 - Water Chemistry (3.0 cr)
- CE 5246 - Environmental Remediation Technologies (3.0 cr)
- CHEM 5150 - Organic and Stable Isotope Biogeochemistry (3.0 cr)
- GEOG 4446 - Water Processes and Management (3.0 cr)
- GEOL 4201 - Introduction to Watershed Hydrology (3.0 cr)
- GEOL 5103 - Geological Paleolimnology (3.0 cr)
- GEOL 5210 - Glacial and Quaternary Geology (4.0 cr)
- GEOL 5220 - Advances in Paleoclimatology (3.0 cr)
- GEOL 5250 - Hydrogeology (4.0 cr)
- GEOL 5260 - Fluvial Geomorphology (4.0 cr)
- GEOL 5601 - Introduction to Stream Restoration (3.0 cr)
- GEOL 8602 - Stream Restoration Practice (2.0 cr)
- LIM 5010 - Integrated Approaches to the Study of Inland Waters (3.0 cr)
- LIM 5011 - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters (2.0 cr)
- LIM 5012 - Integrated Approaches to the Study of Inland Waters II (3.0 cr)
- LIM 5013 - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters II (2.0 cr)
- LIM 5101 - Physical Limnology (3.0 cr)
- LIM 5102 - Chemical Limnology (3.0 cr)
- LIM 5103 - Geological Paleolimnology (3.0 cr)
- LIM 5104 - Geochemical, Physical, and Biological processes in Aquatic Sediments (2.0 cr)
- LIM 5105 - Research Frontiers and New Directions in Limnology and Environmental Science (1.0 cr)
- PHYS 5541 - Fluid Dynamics (3.0 cr)
- WRS 5050 - Special Topics in Water Resources Science (1.0 - 3.0 cr)

Thesis (24 cr)

Take 24 credits

- WRS 8888 - Thesis Credits: Doctoral (1.0 - 24.0 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.

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.

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

Core Courses (14 cr)

Limnology

- LIM 5010 - Integrated Approaches to the Study of Inland Waters (3.0 cr)
- LIM 5011 - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters (2.0 cr)
- LIM 5012 - Integrated Approaches to the Study of Inland Waters II (3.0 cr)
- LIM 5013 - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters II (2.0 cr)

Water Policy

- CE 5201 - Water Policy (3.0 cr)

Ethics

- WRS 8581 - Research and Professional Ethics in Water Resources and Environmental Science (0.5 cr)

Seminar

- WRS 8100 - Interdisciplinary Seminar in Water Resources (0.5 - 3.0 cr)

Electives (10 cr)

Approved electives to fulfill the required 24 course credits.

Take 10 or more credit(s) from the following:

- BIOL 4761 - Ichthyology (3.0 cr)
- BIOL 5801 - Microbial Ecology (2.0 cr)
- BIOL 5805 - Fisheries Ecology and Management (3.0 cr)
- BIOL 5808 - Landscape Ecology: Theory and Application (3.0 cr)
- BIOL 5833 - Stream Ecology (3.0 cr)
- BIOL 5861 - Lake Ecology (3.0 cr)
- BIOL 5863 - Ecosystems Ecology (3.0 cr)
- BIOL 5870 - Wetland Ecology (3.0 cr)
- CE 4213 - Open Channel Hydraulics (3.0 cr)
- CE 4215 - Hydraulic Design (3.0 cr)
- CE 4228 - Watershed Engineering (3.0 cr)
- CE 5216 - Applications in Environmental Modeling (3.0 cr)
- CE 5237 - Water Quality Engineering (3.0 cr)
- CE 5241 - Water Chemistry (3.0 cr)
- CE 5246 - Environmental Remediation Technologies (3.0 cr)
- CHEM 5150 - Organic and Stable Isotope Biogeochemistry (3.0 cr)
- GEOG 4446 - Water Processes and Management (3.0 cr)
- GEOL 4201 - Introduction to Watershed Hydrology (3.0 cr)
- GEOL 5103 - Geological Paleolimnology (3.0 cr)
- GEOL 5210 - Glacial and Quaternary Geology (4.0 cr)
- GEOL 5220 - Advances in Paleoclimatology (3.0 cr)
- GEOL 5250 - Hydrogeology (4.0 cr)
- GEOL 5260 - Fluvial Geomorphology (4.0 cr)
- GEOL 5601 - Introduction to Stream Restoration (3.0 cr)
- GEOL 8602 - Stream Restoration Practice (2.0 cr)
- LIM 5010 - Integrated Approaches to the Study of Inland Waters (3.0 cr)
- LIM 5011 - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters (2.0 cr)
- LIM 5012 - Integrated Approaches to the Study of Inland Waters II (3.0 cr)
- LIM 5013 - Laboratory and Discussion in Integrated Approaches to the Study of Inland Waters II (2.0 cr)
- LIM 5101 - Physical Limnology (3.0 cr)



- LIM 5102 - Chemical Limnology (3.0 cr)
- LIM 5103 - Geological Paleolimnology (3.0 cr)
- LIM 5104 - Geochemical, Physical, and Biological processes in Aquatic Sediments (2.0 cr)
- LIM 5105 - Research Frontiers and New Directions in Limnology and Environmental Science (1.0 cr)
- PHYS 5541 - Fluid Dynamics (3.0 cr)
- WRS 5050 - Special Topics in Water Resources Science (1.0 - 3.0 cr)