Duluth Campus

Mathematical Sciences M.S.

Mathematics & Statistics

Swenson College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
UMD Mathematics/Statistics 140 Solon Campus Center, 1117 University Dr, Duluth, MN 55812, (phone: 218-726-8747 or 218-726-8254)
Email: umdmathstat_dgs@d.umn.edu
Website: https://scse.d.umn.edu/about/departments-and-programs/mathematics-statistics-department

- Program Type: Master's
- Requirements for this program are current for Fall 2022
- 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.

The Mathematical Sciences MS 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 for full consideration in fellowships and other financial assistance; later applications are accepted.

International and domestic applicants whose first language is not English must submit score(s) from one of the following tests:

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.

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Information current as of March 29, 2024

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 comprises 4 credits of MATH 8744, or STAT 8774 for students pursuing the Statistics track.

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.

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

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 courses:
MATH 8990 - Graduate Colloquium (0.5 cr)
MATH 8991 - Comprehensive Exam (0.5 cr)

Computation (0 to 3 credits)

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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 5271 - Data-Driven Dynamical Systems Modeling (3.0 cr)
MATH 5830 - Numerical Analysis: Approximation and Quadrature (4.0 cr)
MATH 5840 *{Inactive}*(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)

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