Duluth Campus

Geographic Information Science B.S.

Geography & Philosophy

College of Arts, Humanities and Social Sciences

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2022
- Required credits to graduate with this degree: 120
- Required credits within the major: 50 to 54
- Degree: Bachelor of Science

Because of the growing awareness across disciplines of the strategic value of Geographic Information Science (GIS), particularly through its ability to understand better the complexity of economic, environmental, and social systems, the US Department of Labor identifies GIS as one of nine high growth industries. For example, GIS has been instrumental to emergency managers in the face of natural hazards, who utilize it to determine how communities can best mitigate such disasters. Urban planners utilize GIS to optimize existing systems and services, while forecasting where they will be most needed in the future based on emerging population and growth trends. Remote sensing allows land managers to monitor environmental changes via satellite and drone technologies, and inform adaptation strategies for industry and communities alike. Spatial analysis provides epidemiologists with the tools necessary to track and forecast the spread of diseases, helping health care officials limit their impact. In each of these cases, GIS professionals use geospatial technologies to create sustainable solutions to environmental, economic, and societal problems.

The mission of the GIS BS program at UMD is to train future GIS professional by providing theoretical and practical instruction, modeling and mentoring, and real-world professional experiences, guided by the GIS&T body of knowledge and the GISP code of ethics.

Students learn both the basic and the latest methods to collect, manage, analyze and visualize data, including scripting methods for web-delivery of geographical information and automation of geo-processes. And they learn how to put these methods into action through application classes, community-based research projects and internships.

The GIS program is assessed annually by students, faculty and GIS professionals conjointly, to ensure it remains relevant and keeps in touch with the fast-paced evolution of the field.

The major interweaves well with disciplines such as environment, sustainability and geography, computer science, statistics, mathematics, history, political science, anthropology, sociology, criminology, geology, biology, chemistry and engineering. Because of the interdisciplinary nature of GIS applications, students are encouraged to double major.

Program Delivery

This program is available:

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

Admission Requirements

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

General Requirements

The Board of Regents, on recommendation of the faculty, grants degrees from the University of Minnesota. Requirements for an undergraduate degree from University of Minnesota Duluth include the following:

1. Students must meet all course and credit requirements of the departments and colleges or schools in which they are enrolled including an advanced writing course. Students seeking two degrees must fulfill the requirements of both degrees. However, two degrees cannot be awarded for the same major.
2. Students must complete all requirements of the Liberal Education Program.
3. Students must complete a minimum of 120 semester credits.
4. At least 30 of the last 60 degree credits earned immediately before graduation must be awarded by UMD.
5. Students must complete at least half of their courses at the 3xxx-level and higher at UMD. Study-abroad credits earned through courses taught by UM faculty and at institutions with which UMD has international exchange programs may be used to fulfill this requirement.
6. If a minor is required, students must take at least three upper division credits in their minor field from UMD.
7. The minimum cumulative UM GPA required for graduation will be 2.00 and will include only University of Minnesota coursework. A minimum UM GPA of 2.00 is required in each UMD undergraduate major and minor. No academic unit may impose higher grade

point standards to graduate.
8. Diploma, transcripts, and certification will be withheld until all financial obligations to the University have been met.

Program Requirements

1) A second field of study (either a minor, another major or dual degree).
2) Study abroad is encouraged for all students and the department makes every effort to facilitate such experiences.

Geography (7 cr)
GEOG 1205 - Our Globalizing World [SOC SCI, GLOBAL PER] (3.0 cr)
GEOG 1414 - The Physical Geography [LE CAT, NAT SCI, SUSTAIN] (4.0 cr)
or EES 1110 - Geology and Earth Systems [LE CAT, NAT SCI, SUSTAIN] (4.0 cr)

Mathematics or Statistics (3 cr)
Take 1 or more course(s) from the following:
•MATH 1160 - Finite Mathematics and Introduction to Calculus [LE CAT, LOGIC & QR] (5.0 cr)
•MATH 1290 - Calculus for the Natural Sciences [LE CAT2, LOGIC & QR] (5.0 cr)
•MATH 1296 - Calculus I [LE CAT, LOGIC & QR] (5.0 cr)
•STAT 2411 - Statistical Methods [LE CAT, LOGIC & QR] (3.0 cr)

Programming (3 cr)
Take 1 or more course(s) from the following:
•CS 1121 - Introduction to Programming in Visual BASIC.NET [LE CAT, LOGIC & QR] (3.0 cr)
•CS 1141 *{Inactive}*(3.0 cr)
•CS 1411 - Introduction to Programming in Matlab (4.0 cr)
•CS 1511 - Computer Science I [LE CAT] (5.0 cr)
•CS 1581 - Honors: Computer Science I [LE CAT] (5.0 cr)

Mapping and Techniques (10 cr)
GIS 2552 - Mapping Our World [LOGIC & QR] (3.0 cr)
GIS 3580 - Earth Imagery (4.0 cr)
ES 4612 - Field Techniques and Research Design (3.0 cr)

GIS Core (4-8 cr)
GIS 3563 - Geographic Information Science I: Theory and Analysis (4.0 cr)
GIS 3564 - Geographic Information Science II: Applied GIS (4.0 cr)
or **Graduate Level Course (consent required)**
GIS 4565 *{Inactive}*(4.0 cr)

GIS Advanced Core (12 cr)
GIS 3597 - Internship in GIS (3.0 - 4.0 cr)
GIS 4909 - Professional Preparedness (1.0 cr)
GIS 4533 - Distributed Geographic Information Services: Mobile and Web Based Solutions (4.0 cr)
or GIS 4586 - Geoprocessing with Python (4.0 cr)
GIS 4585 - Advanced GIS Analytics (4.0 cr)
or GIS 5581 - Digital Image Processing and Analysis (4.0 cr)

GIS Electives (8 cr)
Additional courses taken from either GIS Core will apply to this requirement. This course list excludes: GIS 5533, 5585, 5586.
Take 2 or more course(s) from the following:
•GIS 5571 - Geographic Information Science in Urban Analysis (4.0 cr)
•GIS 5572 - Environmental Application of GIS (4.0 cr)
•GIS 5573 - GIScience in Regional Sustainability Applications (4.0 cr)
•GIS 2xxx - 5xxx
•**Optional Experience**
Take 0 - 4 credit(s) from the following:
•GIS 3591 - Independent Study in GIS (1.0 - 3.0 cr)
•GIS 4910 - Teaching Assistantship (1.0 - 2.0 cr)
•GIS 4999 - Honors Project in Geographic Information Science (1.0 - 4.0 cr)

Advanced Writing Requirement (3 cr)
WRIT 31xx - Adv Writing (3 cr)