

# GEOGRAPHY M.S. - CARTOGRAPHY AND GIS

## General Graduate Program Requirements

Graduate School policies and standards can be found on the Graduate School Policies page (<http://catalog.umn.edu/graduate/school-policies/>).

The minimum GPA for any graduate program is 3.0. Individual programs may require more than a 3.0 to remain in good standing.

The minimum grade for a course to be accepted toward any requirement is C. Individual programs may require higher grades for specific courses.

## MASTER OF SCIENCE - GEOGRAPHY; CARTOGRAPHY AND GIS CONCENTRATION

The Master of Science in Geography with a concentration in Cartography and GIS is appropriate for those whose work is focused on spatial mapping and analysis. Beyond the core requirements specified for the general M.S. (<http://catalog.umn.edu/graduate/college-forestry-conservation/ms-programs/geography-ms/>), an additional 16 credits are required for the concentration (19 if the Methods course is not a GIS class), and electives as needed to complete the 34 to 40 credits for the degree.

- Choices in the core and elective credits will be selected in consultation with the graduate committee to support the research program and student's professional goals. Coursework must be approved by the committee no later than the second semester in residence, but earlier if possible. Per Graduate School policy.
  - At least 20 of the total credits must be taken within the major discipline.
  - At least 20 of the total credits must be in coursework, not research or thesis.
  - At least half of the coursework credits (minimum 10 credits) must be at the 500 level or above.
  - Courses below the 400 level do not count towards the M.S. course requirements.
  - Up to 10 of the 34 or 40 credits may be taken as thesis (GPHY 599).

### Degree Options

For the M.S. in Geography, students are required to complete one of the following options. There is no minimum number of thesis credits that must be taken for any of the options.

#### Thesis Option

This option requires the completion of 34 credits. The student must successfully complete and defend a thesis or one or more papers (i.e., articles) of publishable quality before an examining committee.

#### Professional Paper Option

This option requires the completion of 34 credits. The student must successfully complete and defend a professional paper or one or more papers (i.e., articles) of publishable quality before an examining committee. The difference between a thesis and a professional paper is that while the thesis is directed toward advances in the discipline, the professional paper may be directed toward advances in the profession. A

professional paper may also consist of one or more papers of publishable quality intended for publication in a peer-reviewed journal.

#### Portfolio Option

This option requires the completion of 40 credits. The student must successfully complete a portfolio and written and oral comprehensive examinations.

## Course Requirements

Code	Title	Hours
<b>Graduate Research Seminar</b>		
Complete one of the following courses, 1 credit per semester:		2
BIOS 594	Seminar	
FORS 594	Graduate Seminar (1 cr. per semester)	
NRSM 594	Seminar	
WILD 594	Graduate Seminar in Wildlife Biology	
<b>Graduate Research Design</b>		
Complete one of the following courses:		3-4
GPHY 504 & GPHY 505	Research Design in the Geographical Sciences I and Research Design in Geographical Sciences II	
NRSM 500	Conservation and Social Science Methods	
GEO 508	Fundamentals of Academic Research	
WILD 540 & WILD 541	Research Design and Research Design Lab	
<b>Graduate Research Methods</b>		
Complete one of the following courses:		3
Quantitative methods		
ENSC 474	Environmental Analytics	
FORS 538	Ecological Statistics	
SOCI 563	Social Data Analysis	
STAT 451	Statistical Methods I	
	or STAT 452 Statistical Methods II	
Qualitative methods		
SOCI 561	Qualitative Methods	
Historical or survey methods		
Advanced GIS or computer methods		
<b>Additional Graduate Seminar</b>		
Complete one of the following courses:		3
GPHY 525	Advanced Physical Geography	
GPHY 560	Seminar in Planning	
GPHY 580	Seminar GIS & Cartography	
<b>Concentration Requirements</b>		
Complete all of the following courses:		
GPHY 487	Remote Sensing/Raster GIS	3
GPHY 488	Applications of GIS	3
GPHY 489	Cartography/GIS Laboratory	1
<b>Concentration Electives</b>		
Complete 9 credits of the following courses:		9
FORS 505	Sampling Methods	
GPHY 468	Community & Regional Analysis	
GPHY 469	Planning & Analysis Laboratory	
GPHY 481	Advanced Cartographic Design	

GPHY 485	Internet GIS
GPHY 489	Cartography/GIS Laboratory
GPHY 587	Image Analysis & Modeling
GPHY 589	Cartography/GIS Laboratory
GPHY 598	Internship
WILD 562	Wildlife Habitat Modeling

**Electives and Thesis**

Complete 7-12 additional credits chosen in consultation with your faculty advisor according to the selected track. 7-12

---

**Total Hours** **34-40**