

# Department of Geography

(College of Social and Behavioral Sciences)

[www.uni.edu/geography](http://www.uni.edu/geography)

The Department of Geography offers the following programs:

## Undergraduate Major (B.S.)

- Geographic Information Science (p. 1)

## Undergraduate Major (B.A.)

- Environmental Resource Management (p. 1) (also listed in Department of Biology, Department of Earth and Environmental Sciences, and Department of Health, Recreation and Community Services)
- Geography (p. 5)

## Minor

- Geography (p. 6)

## Graduate Major (M.A.)

- Geography (p. 6)

## Program Certificate

- Crime Mapping and Analysis (p. 6) (also listed in Department of Sociology, Anthropology, and Criminology)
- Geographic Information Systems (GIS) and Cartography (p. 7)
- Unmanned Aerial Systems (p. 7)

## Bachelor of Science Degree Programs

### Geographic Information Science Major

The B.S. Geographic Information Science major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus course choices for a focus within the major and electives, needed to complete the minimum of 120 hours.

#### Required

Geographic Information Science core:		
GEOG 1120	Peoples, Cultures, and Environments	3
GEOG 1210	Planet Earth	3
GEOG 1211	Planet Earth Laboratory	1
GEOG 2320	Drones for Mapping and Communication	3
GEOG 2410	Geographic Information Systems I	3
GEOG 4370/5370	Remote Sensing of the Environment	3

GEOG 4320/5320	Geographic Information Systems II	3
GEOG 4350/5350	Global Positioning System Field Survey Methods	3
GEOG 4310/5310	GIS Applications: (Variable Topic)	3
GEOG 3598	Research Experience in Geography @	1-3
GEOG 4550	Senior Seminar in Geography	3
GEOG 4560	Professional Seminar	1
<b>Statistics (Choose Two)</b>		<b>6</b>
STAT 1772	Introduction to Statistical Methods	
SOC SCI 2020	Social Sciences Statistics	
GEOG 3778/5778	Spatial Data Analysis *	
<b>Computer Science (Choose One)</b>		<b>3</b>
GEOG 4390/5390	GIS Programming	
CS 3140/5140	Database Systems *	
<b>Geography Electives</b>		<b>15</b>
Choose any Geography course in consultation with a Geography faculty advisor. Up to three (3) non-Geography courses can count toward Geography Electives with departmental approval.		
<b>Total Hours</b>		<b>54-56</b>

\* These courses have additional prerequisites as follows:  
GEOG 3778/5778 has prerequisite of STAT 1772 or SOC SCI 2020.  
CS 3140/5140 has prerequisites of CS 1520; CS 1800.

@This course meets the Bachelor of Science degree undergraduate research course requirement.

**Note:** Choice of courses and subsequent course prerequisites may increase the length of this program.

## Bachelor of Arts Degree Programs

### Environmental Resource Management Major

The Environmental Resource Management major is aimed at students searching for career options in the broadly-defined 'outdoor environment' that are related to natural resources, environmental systems, and sustainable development. This program will prepare students for careers in the environmental and human management of public and private spaces across differing categories of environmental systems - from public parks and lands to conservancy units managed by governmental and other non-profit agencies and organizations. This program aims to serve those students who do not wish to pursue careers as environmental scientists *per se* from more tightly focused 'environmental science' programs.

- *STUDENTS ARE REQUIRED TO TAKE THE CORE REQUIREMENTS (31 HOURS) AND MAY CHOOSE ONLY ONE OF THE FOUR SPECIALIZATION TRACKS (30-32 HOURS).*
- *Each track is composed of clusters of courses with a specific concentration, each of which has a separate hourly requirement.*

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- For purposes of this degree program, those prerequisite courses required by BIOL, EARTHSCI, GEOG, and RTNL for mid/upper-level courses in each Track THAT ARE NOT INCLUDED IN THE CORE REQUIREMENTS will normally be waived by the appropriate departments.
- The separate tracks allow students to specialize in the area of most general interest while the primary & secondary foci within each track make sure students also are exposed to a wide range of important auxiliary coursework.
- A student with a major in the interdisciplinary B.A. Environmental Resource Management: Ecosystems Track may not declare another major or minor in biology.
- By permission of the Provost's Office, students enrolled in the B.A. Environmental Resource Management major will be considered majors in all four of the participating departments.

### Core Requirements

BIOL 2051	General Biology: Organismal Diversity	4
BIOL 3100	Evolution, Ecology and the Nature of Science*	3
CHEM 1110	General Chemistry I	4
EARTHSCI 1300	Introduction to Geology	4
or		
GEOG 1210 & GEOG 1211	Planet Earth and Planet Earth Laboratory	
EARTHSCI 3330/5330	Geomorphology	4
GEOG 2260	Environmental Resource Management	3
GEOG 2410	Geographic Information Systems I	3
RTNL 4320	Financial Resource Management in Recreation, Tourism and Nonprofit Leadership	3
HIST 4170/5170	U.S. Environmental History	3
<b>Total Hours</b>		<b>31</b>

\* For students pursuing the Environmental Resource Management B.A. degree, the Department of Biology will waive the BIOL 2052 and CHEM 1120 prerequisites for enrollment into BIOL 3100.

**Encouraged Certificates:** Certificate programs that are appropriate to couple with the ERM major and help to expand specific, relevant experiences for students.

- GIS & Cartography (Department of Geography)
- Sustainability (Interdisciplinary)
- Outdoor Recreation (Department of Health, Recreation and Community Services)
- Tourism (Department of Health, Recreation and Community Services)
- Nonprofit Management Certificate (Department of Health, Recreation and Community Services)

- Environmental Health Certificate (Department of Health, Recreation and Community Services)

- Public History (Department of History)

## Ecosystems Track

A total of 31-32 hours are needed for this track. There are 11-12 hours of required courses. In addition, student select courses from all three elective categories (A, B, & C) to accumulate to a minimum of 20 hours. At least one course must be taken from each elective category.

### Required

BIOL 4168/5168	Ecology**	4
CHEM 1120	General Chemistry II §	4
MATH 1140	Precalculus	3-4
or STAT 1772	Introduction to Statistical Methods	

### Electives:

**20**

### Category A - Content Management Related Courses (pick at least 1 course)

BIOL 4105/5105	Wildlife Ecology and Management**	
BIOL 4108/5108	Biodiversity Conservation Policy**	
BIOL 4167/5167	Conservation Biology**	
BIOL 4180/5180	Restoration Ecology**	

### Category B - Content Related Courses (pick at least 1 course)

BIOL 3109/5109	Plants of North America	
BIOL 3160	Field Zoology of Vertebrates*	
BIOL 3170	Entomology*	
BIOL 4157/5157	Biostatistics**	
BIOL 4164/5164	Mammalogy**	
BIOL 4172/5172	Developmental Plant Anatomy**	
GEOG 4310/5310	GIS Applications: (Variable Topic)	
GEOG 4320/5320	Geographic Information Systems II	

### Category C - Cognates (pick at least 1 course)

EARTHSCI 1200	Elements of Weather	
ENGLISH 4785/5785	Applied Writing: Projects, Grants and Careers^	
GEOG 2210	Modern Climate Change: Evidence and Predictions	
GEOG 2240	Natural Hazards and Disasters	
GEOG 3179	Cooperative Education in Geography^	
or BIOL 3179	Cooperative Education	
or EARTHSCI 3430	Internship	
or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership	
or PH 4180	Internship	
GEOG 3220	Environmental Geography: Variable Topic^	
GEOG 4220/5220	Soils and Landscapes	
GEOG 4270/5270	Science of Scenery	

GEOG 4240/5240	The Ice Age ^
GEOG 4250/5250	Laboratory Methods in Environmental Geography
GEOG 4370/5370	Remote Sensing of the Environment
MGMT 3183	Leadership Skills ^
MGMT 3185	Project Management ^
RTNL 2120	Foundations of Tourism
RTNL 4553/5553	Trends and Issues in Outdoor Recreation
RTNL/HIST 4556	History of Outdoor Recreation
<b>Total Hours</b>	<b>31-32</b>

\* For students pursuing the Environmental Resource Management B.A. degree, the Department of Biology will waive BIOL 2052 and CHEM 1120 for BIOL 3000-level courses.

\*\*For students pursuing the Environmental Resource Management B.A. degree, the Department of Biology will waive BIOL 3140 as a prerequisite for BIOL 4000-level courses.

§ Students pursuing the Ecosystems track can take CHEM 1110 and CHEM 1120 (8 credits) OR CHEM 1130 (5 credits). CHEM 1130 is designed for students with exceptional preparation in Chemistry. Taking CHEM 1130 changes the total degree requirement from 62-63 credit hours to 59-60 credit hours.

^ These courses have additional prerequisites as follows:  
 ENGLISH 4785/5785 has prerequisites of ENGLISH 2770 or consent of instructor; junior standing.  
 GEOG 3220 has a prerequisite of GEOG 1120 or GEOG 1210 or GEOG 2210 or GEOG 1110 or consent of instructor.  
 GEOG 4240/5240 has prerequisites of GEOG 1210; GEOG 2210; EARTHSCI 1300; or consent of instructor; junior standing.  
 MGMT 3183 has a prerequisite of MGMT 3965/5965.  
 GEOG 3179 has prerequisites of 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department.  
 RTNL 4320 has prerequisites of three (3) credit hours of RTNL 31XX; junior standing. For students pursuing the Environmental Resource Management major, Department of Health, Recreation and Community Services will waive the prerequisites of 3 hours of RTNL 31XX.  
 RTNL 4510 has prerequisites of senior standing; consent of Internship Coordinator and a corequisite of RTNL 4520. For students pursuing the Environmental Resource Management major, Department of Health, Recreation and Community Services will waive this corequisite.  
 PH 4180 has prerequisites of PH 3170; senior standing; 2.50 cumulative GPA; consent of Division of Health Promotion and Education Coordinator of Student Field Experiences.

### Geosystems Track

A total of 30 hours are needed for this track, with a minimum of 21 hours from the Primary Focus group and 9 hours from the Secondary Focus group.

#### Electives

<b>Primary Focus - Content Related Courses</b>	<b>21</b>
EARTHSCI 1200	Elements of Weather
EARTHSCI 3350/5355	Environmental Hydrology ^

EARTHSCI 3322	Earth Materials ^
GEOG 2210	Modern Climate Change: Evidence and Predictions
GEOG 2240	Natural Hazards and Disasters
GEOG 3220	Environmental Geography: Variable Topic * ^
or	
EARTHSCI 3345/5345	Environmental Geology ***
GEOG 4220/5220	Soils and Landscapes
GEOG 4230/5230	Rivers
GEOG 4250/5250	Laboratory Methods in Environmental Geography
GEOG 4370/5370	Remote Sensing of the Environment
RTNL 2130	Foundations of the Nonprofit Sector
RTNL 4553/5553	Trends and Issues in Outdoor Recreation
RTNL 4554/5554	Managing Recreation Impacts on the Natural Environment
<b>Secondary Focus - Management Cognates</b>	<b>9</b>
BIOL 4105/5105	Wildlife Ecology and Management **
BIOL 4180/5180	Restoration Ecology **
EARTHSCI 3325/5325	Sedimentary Geology ****
EARTHSCI 3360/5360	Field and Laboratory Methods in Hydrology
ECON 3225/5225	Environmental Economics ^
ENGLISH 4785/5785	Applied Writing: Projects, Grants and Careers ^
GEOG 4170/5170	Climate Action Planning
GEOG 4240/5240	The Ice Age *
GEOG 4270/5270	Science of Scenery
GEOG 4310/5310	GIS Applications: (Variable Topic) ^
GEOG 4320/5320	Geographic Information Systems II
RTNL 2120	Foundations of Tourism
RTNL/HIST 4556	History of Outdoor Recreation
RTNL 4776/5776	Eco, Adventure and Sport Tourism
MGMT 3185	Project Management ^
POL AMER 3172	Public Budgeting ^
BIOL 3179	Cooperative Education ^
or GEOG 3179	Cooperative Education in Geography
or EARTHSCI 3430	Internship
or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership
or PH 4180	Internship
Other courses as approved by advisors and program director	
<b>Total Hours</b>	<b>30</b>

\* \* For students pursuing the Geosystems Track, the Geography Department will accept GEOG 1210 and GEOG 1211 or

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EARTHSCI 1300 as the prerequisite for enrollment into all listed Geography courses except GEOG 4310/5310 and GEOG 4320/5320.  
 \*\*\* The Biology Department will waive BIOL 3140 as a prerequisite for BIOL 4105/5105 and BIOL 4180/5180.

\*\*\*\* The Earth and Environmental Sciences Department will accept GEOG 1210 and GEOG 1211 as substitutes for courses that require EARTHSCI 1300.

\*\*\*\*\* The Earth and Environmental Sciences Department will waive the requirement of EARTHSCI 1320 for EARTHSCI 3325/5325.

# # The Department of Health, Recreation and Community Services will waive RTNL 2120 as a prerequisite for RTNL 4776/5776.

^ ^ These courses have additional prerequisites as follows:

EARTHSCI 3322 has a prerequisite of EARTHSCI 1300.

EARTHSCI 3350/5350 has prerequisites of EARTHSCI 1300;

junior standing.

GEOG 3220 has a prerequisite of GEOG 1120 or GEOG 1210 or

GEOG 2210 or GEOG 1110 or consent of instructor.

ECON 3225/5225 has prerequisites of ECON 1041, ECON 1051; junior standing.

ENGLISH 4785/5785 has prerequisites of ENGLISH 2770 or consent of instructor; junior standing.

GEOG 4310/5310 has prerequisites of GEOG 2410; junior standing.

GEOG 4320/5320 has prerequisites of GEOG 2410 or consent of instructor; junior standing.

POL AMER 3172 has prerequisites of POL AMER 1014;

POL AMER 1048.

GEOG 3179 has prerequisites of 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department.

RTNL 4510 has prerequisites of senior standing; consent of Internship Coordinator and a corequisite of RTNL 4520. For students pursuing the Environmental Resource Management major, the Department of Health Recreation and Community Services will waive this corequisite.

PH 4180 has prerequisites of PH 3170; senior standing; 2.50 cumulative GPA; consent of Division of Health Promotion and Education Coordinator of Student Field Experiences.

## Resource Administration Track

A total of 30 hours are needed for this track, with a minimum of 21 hours from the Primary Focus group and 9 hours from the Secondary Focus group.

### Primary Focus - Content Related Courses 21

GEOG 2210	Modern Climate Change: Evidence and Predictions
GEOG 2240	Natural Hazards and Disasters
GEOG 4170/5170	Climate Action Planning
PH 3720/5720	Environmental and Occupational Health Regulations
RTNL 2130	Foundations of the Nonprofit Sector
RTNL 3337	Human Resource Development for Recreation, Tourism and Nonprofit Leadership
RTNL 4310/5310	Areas and Facilities in Recreation, Tourism and Nonprofit Leadership
RTNL 4554/5554	Managing Recreation Impacts on the Natural Environment

RTNL/HIST 4556	History of Outdoor Recreation
RTNL 4776/5776	Eco, Adventure and Sport Tourism
<b>Secondary Focus - Cognates 9</b>	
BIOL 4167/5167	Conservation Biology **
GEOG 4220/5220	Soils and Landscapes
GEOG 4230/5230	Rivers
GEOG 4250/5250	Laboratory Methods in Environmental Geography
GEOG 4270/5270	Science of Scenery
GEOG 4310/5310	GIS Applications: (Variable Topic)
GEOG 4320/5320	Geographic Information Systems II
GEOG 4370/5370	Remote Sensing of the Environment
ENGLISH 4775/5775	Applied Writing: Specialized Documents ^
or ENGLISH 4785/5785	Applied Writing: Projects, Grants and Careers
PH 3710/5710	Environmental Health Science
RTNL 2120	Foundations of Tourism
RTNL 4552/5552	Theory and Practice of Outdoor Education
RTNL 4553/5553	Trends and Issues in Outdoor Recreation
RTNL 4779/5779	Community Planning Workshop
MGMT 3185	Project Management ^
POL AMER 3172	Public Budgeting ^
GEOG 3179	Cooperative Education in Geography ^
or BIOL 3179	Cooperative Education
or EARTHSCI 3430	Internship
or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership
or PH 4180	Internship
Other courses as approved by advisors and program director	
<b>Total Hours</b>	<b>30</b>

\* \* The Biology Department will waive BIOL 3140 as a prerequisite for BIOL 4167/5167.

\*\*\*\* The Geography Department and the Department of Health, Recreation and Community Services will waive RTNL 2120 as a prerequisite for enrollment into RTNL 4310/5310.

^ ^ These courses have additional prerequisites as follows:

RTNL 4776/5776 has prerequisites of RTNL 2120 or consent of instructor; junior standing.

ENGLISH 4775/5775 has prerequisites of MGMT 2080 or ENGLISH 2770 or consent of instructor; junior standing.

ENGLISH 4785/5785 has prerequisites of ENGLISH 2770 or consent of instructor; junior standing.

POL AMER 3172 has prerequisites of POL AMER 1014; POL AMER 1048.

GEOG 3179 has prerequisites of 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department.



RTNL 4510 has prerequisites of senior standing; consent of Internship Coordinator and a corequisite of RTNL 4520. For students pursuing the Environmental Resource Management major, the Department of Health, Recreation and Community Services will waive this corequisite.

PH 4180 has prerequisites of PH 3170; senior standing; 2.50 cumulative GPA; consent of Division of Health Promotion and Education Coordinator of Student Field Experiences.

### Environmental Compliance Track

A total of 32 hours need for this focus area, with 15 hours of required courses, a minimum of 10 hours from the Primary Focus group and 7 hours from the Secondary Focus group.

#### Required

ECON 1041	Principles of Macroeconomics	3
ECON 1051	Principles of Microeconomics	3
ECON 3225/5225	Environmental Economics	3
PH 3720/5720	Environmental and Occupational Health Regulations	3
PHIL 2550	Environmental Ethics	3

#### Primary Focus - Content Related Courses 10

EARTHSCI 1200	Elements of Weather	
EARTHSCI 1400	Introduction to Environmental Earth Science	
EARTHSCI 3230/5230	Air Quality ^	
EARTHSCI 3345/5345	Environmental Geology *	
or		
GEOG 3220	Environmental Geography: Variable Topic	
EARTHSCI 3350/5350	Environmental Hydrology *	

#### Secondary Focus - Cognates 7

EARTHSCI 3240/5240	Air Quality Modeling ^	
EARTHSCI 3250/5250	Measurement and Analysis of Air Quality ** ^	
EARTHSCI 3325/5325	Sedimentary Geology ***	
EARTHSCI 3355/5355	Hydrogeology *	
GEOG 4220/5220	Soils and Landscapes	
GEOG 4230/5230	Rivers	
GEOG 4370/5370	Remote Sensing of the Environment	
PH 3710/5710	Environmental Health Science	
RTNL 4554/5554	Managing Recreation Impacts on the Natural Environment	
MGMT 3153	Organizational Management *	
MGMT 3185	Project Management ^	
POL AMER 1048	Introduction to Public Administration	
GEOG 3179	Cooperative Education in Geography ^	
or BIOL 3179	Cooperative Education	
or EARTHSCI 343	Internship	
or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership	

or PH 4180	Internship	
Other courses as approved by advisors and program director		
<b>Total Hours</b>		<b>32</b>

\* \* The Earth and Environmental Sciences Department will accept GEOG 1210 and GEOG 1211 as a substitute for courses that require EARTHSCI 1300.

\*\*\*\* The Earth and Environmental Sciences Department will waive EARTHSCI 3230/5230 as a prerequisite for enrollment into EARTHSCI 3250/5250.

\*\*\*\*\* The Earth and Environmental Sciences Department will waive the requirement for EARTHSCI 1320 for EARTHSCI 3325/5325.

^ ^ These courses have additional prerequisites as follows: GEOG 3220 has a prerequisite of GEOG 1120 or GEOG 1210 or GEOG 2210 or GEOG 1110 or consent of instructor. EARTHSCI 3240/5240 has prerequisites of EARTHSCI 1200; junior standing.

EARTHSCI 3250/5250 has prerequisites of EARTHSCI 1200; junior standing and a prerequisite or corequisite of EARTHSCI 3230/5230.

GEOG 3179 has prerequisites of 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department.

RTNL 4510 has prerequisites of senior standing; consent of Internship Coordinator and a corequisite of RTNL 4520. For students pursuing the Environmental Resource Management major, the Department of Health, Recreation and Community Services will waive this corequisite.

PH 4180 has prerequisites of PH 3170; senior standing; 2.50 cumulative GPA; consent of Division of Health Promotion and Education Coordinator of Student Field Experiences.

### Geography Major

The Geography major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

#### Required

Geography:		
GEOG 1110	Global Geography	3
GEOG 1120	Peoples, Cultures, and Environments	3
GEOG 1210	Planet Earth	3
GEOG 1310	Digital Earth	3
GEOG 2410	Geographic Information Systems I	3
GEOG 4550	Senior Seminar in Geography	3
GEOG 4560	Professional Seminar	1

#### Geography Electives 21

Choose any Geography course in consultation with a Geography faculty advisor. Up to three (3) non-Geography courses can count toward Geography Electives with departmental approval.

<b>Total Hours</b>		<b>40</b>
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## Minor Geography Minor

### Required

Geography:		
GEOG 1120	Peoples, Cultures, and Environments	3
or GEOG 1110	Global Geography	
GEOG 1210	Planet Earth	3
<b>Electives in geography</b> *		<b>12</b>
<b>Total Hours</b>		<b>18</b>

\* Only 3 hours of credit in GEOG 3179 will count toward electives for the minor.

## Master of Arts Degree Program Major in Geography

Students interested in enrolling in this program must submit a completed Application for Admission to Graduate Study and should refer to their MyUNiverse Student Center To-Do list or contact the graduate coordinator in the Department of Geography for any other application requirements. Applications should include two letters of recommendation, a brief statement about professional interests and career objectives, and transcripts of both undergraduate and graduate credit. Graduate information and application for graduate admission can be found at <https://admissions.uni.edu/application>.

The Graduate Record Examination (General Test) **is not** required for admission to the program.

**Only graduate courses (course number 5000 or above) will apply to a graduate degree, even if the undergraduate course number (4999 or less) is listed. No exceptions will be made.**

The major in Geography is available on the **thesis (research)** and **non-thesis (professional)** options. A **minimum of 33 semester hours**, including 6 hours GEOG 6299 for thesis research and writing, is required for the **thesis** option. Students must successfully present a written and oral thesis proposal prior to registration in GEOG 6299. A **minimum of 30 semester hours**, including 3 hours GEOG 6598 for completion of a research paper, is required for the **non-thesis** option. A **minimum of 17 hours of 6000-level course work is required for both the thesis and non-thesis options.** Any 6000-level course offered as a graded course must be taken on a graded basis. Students pursuing either thesis or non-thesis option may select from the following research concentrations: Geographic Information Science and Remote Sensing; Environmental and Earth Systems; Geomorphology; Human Spatial Systems; Planning and Development; Geography Education.

### Thesis Option:

#### Required Geography

GEOG 6010	Geographic Research Methods	3
GEOG 6550	Seminar (History of Geographic Thought )	3
GEOG 6299	Research	6

<b>Electives</b> *	<b>21</b>
<b>Total Hours</b>	<b>33</b>

\* At least 12 of the 21 hours must be in geography; at least 3 of the 18 hours must be at the 6000-level; cannot include GEOG 6598; additional hours of GEOG 6299 cannot count toward the minimum 21 elective hours.

### Non-Thesis Option:

#### Required Geography

GEOG 4570/5570	Sustainability and Geographic Leadership	3
GEOG 5150	Regional Geography: (Variable Topic)	3
GEOG 5270	Science of Scenery	3
GEOG 6010	Geographic Research Methods	3
GEOG 6550	Seminar (History of Geographic Thought )	3
GEOG 6598	Directed Research Project	3
<b>Electives</b> *		<b>12</b>
<b>Total Hours</b>		<b>30</b>

\* At least 3 hours must be a content elective and 3 hours must be a skills elective. Students may take an additional 3 hours of GEOG 6598 as an elective with approval of the Graduate Coordinator.

Each student's program (beyond the required core courses) will be determined by individual needs in consultation with their graduate advisor and the graduate coordinator. For the thesis option, an oral thesis defense is required. For the non-thesis option, a final presentation of the research paper is required.

## Program Certificate

The University of Northern Iowa makes available, in addition to traditional programs, the opportunity for students to earn program certificates. Program certificates provide an alternative to programs leading to a degree, a major, or a minor; they certify that an individual has completed a program approved by the university. For information on the following program certificate, contact the Department of Geography or the Office of the Registrar, which serves as the centralized registry.

### Certificate in Crime Mapping and Analysis

This interdisciplinary certificate provides students with both theoretical and applied training in spatial mapping and the analysis of crime data. This program certificate is offered jointly by the Department of Geography and the Department of Sociology, Anthropology and Criminology.

#### Required

Criminology:		
CRIM 2134	Crime Analysis	3
CRIM 3400	Police and Society	3
Geography:		
GEOG 2410	Geographic Information Systems I	3

GEOG 4310/5310	GIS Applications: (Variable Topic)	3
or GEOG 4335/5335	Web Mapping and Data Visualization	
Sociology:		
SOC 1000	Introduction to Sociology	3
SOC SCI 2020	Social Sciences Statistics	3
or STAT 1772	Introduction to Statistical Methods	
<b>Total Hours</b>		<b>18</b>

### Certificate in Geographic Information Systems (GIS) and Cartography

The Certificate in Geographic Information Systems (GIS) and Cartography is designed to give the student a substantial background in the fields of geographic information systems and digital cartography. Students completing the program will be familiar with the terminology, techniques and theory of GIS and cartography. Hands-on computer experience is a major feature of many of the courses. The program complements majors in disciplines other than geography while increasing the geography major's preparation for the job market.

May be taken at **graduate** and **undergraduate** levels. The student must earn a grade point average of at least 3.00 in the courses taken for the certificate. It is the responsibility of the student to notify the Head of the Department of Geography during or immediately after the semester in which the course requirements will be or have been completed. Up to 3 credits can be transferred from another institution. For graduate credit GEOG 2410 can be substituted with GEOG 6286 Studies in GIS.

#### Required

Geography:		
GEOG 2410	Geographic Information Systems I	3
or		
GEOG 6286 Studies in: GIS		
GEOG 4320/5320	Geographic Information Systems II	3
GEOG 4360/5360	Cartographic Design	3
<b>Electives</b>		<b>6</b>

Select two of the following:

Geography:		
GEOG 3778/5778	Spatial Data Analysis	
GEOG 4310/5310	GIS Applications: (Variable Topic)	
GEOG 4335/5335	Web Mapping and Data Visualization	
GEOG 4350/5350	Global Positioning System Field Survey Methods	
GEOG 4370/5370	Remote Sensing of the Environment	
GEOG 4380/5380	Satellite Image Processing	
GEOG 4385/5385	Advanced Unmanned Aerial Systems Mapping	
GEOG 4390/5390	GIS Programming	

**Total Hours** **15**

### Certificate in Unmanned Aerial Systems

#### Required

GEOG 2320	Drones for Mapping and Communication	3
or GEOG 6286 (Studies in: Drones for Mapping and Communication)		
GEOG 4370/5370	Remote Sensing of the Environment	3
GEOG 4385/5385	Advanced Unmanned Aerial Systems Mapping	3

#### Electives (select two of the following) 6-7

GEOG 4310/5310	GIS Applications: (Variable Topic)*	
GEOG 4350/5350	Global Positioning System Field Survey Methods	
GEOG 4380/5380	Satellite Image Processing	
GEOG 4390/5390	GIS Programming*	
ANTH 3450	Archaeological Fieldwork*	
EARTHSCI 3345/5345	Environmental Geology*	
BIOL 4168/5168	Ecology*	

**Total Hours** **15-16**

\* These courses have prerequisites as follows:

GEOG 4310/5310 has prerequisites GEOG 2410 and junior standing.

GEOG 4390/5390 has prerequisites GEOG 2410 and GEOG 4310/5310 or GEOG 4320/5320 or consent of instructor.

ANTH 3450 has prerequisite ANTH 1001.

EARTHSCI 3345/5345 has prerequisites EARTHSCI 1300 or equivalent and junior standing.

BIOL 4168/5168 has prerequisites BIOL 3100 and BIOL 3140 and junior standing.