

# 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 undergraduate and graduate programs and program certificate. Specific requirements for these programs are listed within this Department of Geography section in the following order:

## Undergraduate Major (B.S.)

- Geographic Information Science (p. 1)

## Undergraduate Major (B.A.)

- Environmental Resource Management (p. 2) (also listed in Department of Biology, Department of Earth and Environmental Sciences, and Department of Health, Recreation and Community Services)
- Geography (p. 7)

## Minor

- Geography (p. 9)

## Graduate Major (M.A.)

- Geography (p. 9)

## Program Certificate

- Crime Mapping and Analysis (p. 9) (also listed in Department of Sociology, Anthropology, and Criminology)
- Geographic Information Systems (GIS) and Cartography (p. 10)
- Unmanned Aerial Systems (p. 10)

# Bachelor of Science Degree Programs

## Geographic Information Science Major

The B.S. Geographic Information Science major requires a minimum of 126 total hours to graduate. This total includes Liberal Arts Core requirements and the following specified major requirements, plus course choices for a focus within the major and electives, needed to complete the minimum of 126 hours.

### Required

Geographic Information Science core:	30-32
GEOG 1120 (970:010)	Human Geography
GEOG 1210 (970:026)	Physical Geography
GEOG 1211	Physical Geography Laboratory
GEOG 3598 (970:193)	Research Experience in Geography

GEOG 3310 (970:164)	Geographic Information Systems I	
GEOG 4310/5310 (970:170g)	GIS Applications: (Variable Topic)	
GEOG 4320/5320 (970:174g)	Geographic Information Systems II	
GEOG 4350/5350 (970:175g)	Global Positioning System Field Survey Methods	
GEOG 4360/5360 (970:165g)	Thematic Cartography	
GEOG 4370/5370 (970:173g)	Remote Sensing of the Environment	
GEOG 4550 (970:180)	Senior Seminar in Geography	
GEOG 4560 (970:181)	Professional Seminar	
Geography: (two of the following)		6
GEOG 4335/5335	Web Mapping and GIS	
GEOG 4340/5340 (970:160g)	Spatial Data Analysis *	
GEOG 4380/5380	Satellite Image Processing	
One course from each of the following pairs:		6
Mathematics or Sociology select one of the following:		
STAT 1772 (800:072)	Introduction to Statistical Methods	
SOC 2020 (980:080)	Statistics for Social Research	
Computer Science or Geography select one of the following: :		
GEOG 4390/5390	GIS Programming	
CS 3140/5140 (810:114g)	Database Systems *	
<b>Choose one Application Focus (below) and four courses from that focus</b>		<b>12</b>
<b>Application Focus on Environmental Science and Policy</b>		
Public Health/Environmental:		
PH 3720/5720	Environmental and Occupational Health Regulations	
Earth Science:		
EARTHSCI 3230/5230 (870:123g)	Air Quality *	
Geography:		
GEOG 2210 (970:028)	Modern Climate Change: Evidence and Predictions	
GEOG 3210 (970:137)	Natural Hazards and Disasters	
GEOG 3220 (970:100)	Environmental Geography: Variable Topic	
GEOG 4220/5220 (970:126g)	Soils and Landscapes	

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GEOG 4230/5230 (970:129g)	Rivers	
GEOG 4240/5240 (970:155g)	The Ice Age *	
GEOG 4250/5250 (970:185g)	Laboratory Methods in Environmental Geography	
Or approved courses in cognate areas.		
<b>Application Focus on Unmanned Aerial Systems</b>		
Required		
GEOG 2320	Drones for Mapping and Communication	3
GEOG 4385/5385	Advanced Unmanned Aerial Systems Mapping	3
Elective (select two of the following):		
GEOG 3210 (970:137)	Natural Hazards and Disasters	
GEOG 3220 (970:100)	Environmental Geography: Variable Topic	
GEOG 4220/5220 (970:126g)	Soils and Landscapes	
GEOG 4230/5230 (970:129g)	Rivers	
Or approved courses in cognate areas.		
<b>Application Focus on Planning, Policy, and Development</b>		
Political Science:		
POL AMER 1048 (942:048)	Current and Emerging Issues in Public Administration	
Geography:		
GEOG 3110 (970:101)	Economic Geography	
GEOG 3120 (970:104)	North American Cities	
GEOG 4110/5110 (970:111g)	Cultural Geography	
GEOG 4120/5120 (970:119g)	Demography and Population Geography	
GEOG 4170/5170 (970:168g)	Regional Analysis and Planning	
GEOG 4180/5180 (970:121g)	Locational Analysis for Business	
GEOG 4190/5190 (970:117g)	Transportation Planning and Policy	
Or approved courses in cognate areas.		
<b>Electives</b>		<b>0-2</b>
Other courses, in Geography or cognate areas approved, to reach a minimum of 56 hours.		
Total hours		56

\* These courses have additional prerequisites as follows:  
 GEOG 4340/5340 (970:160g) has prerequisite of  
 STAT 1772 (800:072) or SOC 2020 (980:080)  
 CS 3140/5140 (810:114g) has prerequisites of CS 1520  
 (810:052); CS 1800 (810:080).  
 EARTHSCI 3230/5230 (870:123g) has prerequisites  
 of MATH 1420 (800:060); EARTHSCI 3210/5210  
 (870:121g).  
 GEOG 4240/5240 (970:155g) has prerequisites of  
 GEOG 2210 (970:028); EARTHSCI 1300 (870:031) or  
 consent of instructor.

**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.
- 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 within Department of Biology **cannot** declare the B.A. Environmental Resource Management: Ecosystems Track.
- 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 (840:051)	General Biology: Organismal Diversity	4
BIOL 3100 (840:100)	Evolution, Ecology and the Nature of Science*	3
CHEM 1110 (860:044)	General Chemistry I	4
EARTHSCI 1300 (870:031)	Introduction to Geology	4

or			
GEOG 1210 (970:026)	Physical Geography and Physical Geography & GEOG 1211	Laboratory	
EARTHSCI 3330/5330 (870:141g)	Geomorphology		4
GEOG 4260	Environmental Resource Management		3
GEOG 3310 (970:164)	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 (840:052) and CHEM 1120 (860:048) prerequisites for enrollment into BIOL 3100 (840:100).

**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 32 hours are needed for this track. There are 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 (840:168g)	Ecology **		4
CHEM 1120 (860:048)	General Chemistry II		4
MATH 1140 (800:046)	Precalculus		4

**Electives: 20**

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

BIOL 4105/5105 (840:105g)	Wildlife Ecology and Management *		
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BIOL 4108/5108	Biodiversity Conservation Policy **		
BIOL 4167/5167 (840:167g)	Conservation Biology **		
BIOL 4180/5180 (840:180g)	Restoration Ecology **		

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

BIOL 3112 (840:112)	Invertebrate Zoology *		
BIOL 3118	Marine Biology *		
BIOL 3170 (840:170)	Entomology *		
BIOL 4154/5154 (840:154g)	Aquatic Ecology **		
BIOL 4157/5157 (840:157g)	Biostatistics **		
BIOL 4164/5164 (840:164g)	Mammalogy **		
BIOL 4166/5166 (840:166g)	Plant Systematics **		
GEOG 4310/5310 (970:170g)	GIS Applications: (Variable Topic)		
GEOG 4320/5320 (970:174g)	Geographic Information Systems II		

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

EARTHSCI 1200 (870:021)	Elements of Weather		
ENGLISH 4785/5785 (620:177g)	Applied Writing: Projects, Grants and Careers ^		
GEOG 2210 (970:028)	Modern Climate Change: Evidence and Predictions		
GEOG 3210 (970:137)	Natural Hazards and Disasters		
GEOG 3220 (970:100)	Environmental Geography: Variable Topic ^		
GEOG 4220/5220 (970:126g)	Soils and Landscapes		
GEOG 4240/5240 (970:155g)	The Ice Age ^		
GEOG 4250/5250 (970:185g)	Laboratory Methods in Environmental Geography		
GEOG 4270/5270	Regional Landforms of North America		
GEOG 3179 (970:179)	Cooperative Education in Geography ^		
or BIOL 3179 (840:179)	Cooperative Education		
or EARTHSCI 3430 (870:195)	Internship		
or RTNL 4510	Internship in Recreation, Tourism and Nonprofit Leadership		
or PH 4180	Internship		
GEOG 4370/5370 (970:173g)	Remote Sensing of the Environment		
MGMT 3183	Leadership Skills ^		

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MGMT 3185	Project Management <sup>^</sup>
RTNL 2120	Foundations of Tourism
RTNL 4553/5553	Trends and Issues in Outdoor Recreation
RTNL/HIST 4556	History of Outdoor Recreation

**Total Hours** **32**

- \* For students pursuing the Environmental Resource Management B.A. degree, the Department of Biology will waive BIOL 2052 (840:052) and CHEM 1120 (860:048) for BIOL 3000-level courses.
- \*\* For students pursuing the Environmental Resource Management B.A. degree, the Department of Biology will waive BIOL 3140 (840:140) as a prerequisite for BIOL 4000-level courses.
- <sup>^</sup> These courses have additional prerequisites as follows:  
 ENGLISH 4785/5785 (620:177g) has prerequisites of ENGLISH 2770 (620:077) and one of the following - INSTTECH 4170/5170 (240:170g), ART 3030 (600:125), ENGLISH 4765/5765 (620:102g), ENGLISH 4770/5770 (620:104g), ENGLISH 4775/5775 (620:105g), ENGLISH 4780/5780 (620:107g) or consent of instructor; junior standing.  
 GEOG 3220 (970:100) has a prerequisite of GEOG 1120 (970:010) or GEOG 1210 (970:026) or GEOG 2210 (970:028) or GEOG 1110 (970:040) or consent of instructor.  
 GEOG 4240/5240 (970:155g) has prerequisites of GEOG 1210 (970:026); GEOG 2210 (970:028); EARTHSCI 1300 (870:031); or consent of instructor; junior standing.  
 MGMT 3183 and MGMT 3185 has a prerequisite of MGMT 3153 (150:153).  
 GEOG 3179 (970:179) 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

**Primary Focus - Content Related Courses** **21**

EARTHSCI 1200 (870:021)	Elements of Weather
EARTHSCI 3350/5350 (870:173g)	Environmental Hydrology <sup>^</sup>
EARTHSCI 3322	Earth Materials <sup>^</sup>
GEOG 2210 (970:028)	Modern Climate Change: Evidence and Predictions
GEOG 3210 (970:137)	Natural Hazards and Disasters
GEOG 3220 (970:100)	Environmental Geography: Variable Topic <sup>* ^</sup>
or	
EARTHSCI 3345/5345 (870:171g)	Environmental Geology <sup>***</sup>
GEOG 4220/5220 (970:126g)	Soils and Landscapes
GEOG 4230/5230 (970:129g)	Rivers
GEOG 4250/5250 (970:185g)	Laboratory Methods in Environmental Geography
GEOG 4370/5370 (970:173g)	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> <span style="float: right;"><b>9</b></span>	
BIOL 4105/5105 (840:105g)	Wildlife Ecology and Management <sup>**</sup>
BIOL 4180/5180 (840:180g)	Restoration Ecology <sup>**</sup>
EARTHSCI 3325/5325 (870:136g)	Sedimentary Geology <sup>****</sup>
EARTHSCI 3360/5360	Field and Laboratory Methods in Hydrology
ECON 3225/5225 (920:123g)	Environmental Economics <sup>^</sup>
ENGLISH 4785/5785 (620:177g)	Applied Writing: Projects, Grants and Careers <sup>^</sup>
GEOG 4170/5170 (970:168g)	Regional Analysis and Planning
GEOG 4240/5240 (970:155g)	The Ice Age <sup>*</sup>
GEOG 4270/5270	Regional Landforms of North America
GEOG 4310/5310 (970:170g)	GIS Applications: (Variable Topic) <sup>^</sup>
GEOG 4320/5320 (970:174g)	Geographic Information Systems II <sup>^</sup>
RTNL 2120	Foundations of Tourism
RTNL/HIST 4556	History of Outdoor Recreation
RTNL 4776/5776	Eco, Adventure and Sport Tourism
MGMT 3185	Project Management <sup>^</sup>

POL AMER 3172/51' Public Budgeting ^ (942:172)	
BIOL 3179 (840:179)	Cooperative Education ^
or GEOG 3179 (970:179)	Cooperative Education in Geography
or EARTHSCI 3430 (870:195)	Internship
or RTNL 4510 (870:195)	Internship in Recreation, Tourism and Nonprofit Leadership
or PH 4180 (870:195)	Internship
Other courses as approved by advisors and program director	

**Total Hours** **30**

- \* \* For students pursuing the Geosystems Track, the Geography Department will accept GEOG 1210 (970:026) and GEOG 1211 or EARTHSCI 1300 (870:031) as the prerequisite for enrollment into all listed Geography courses except GEOG 4310/5310 (970:170g) and GEOG 4320/5320 (970:174g).
- \*\* \*\* The Biology Department will waive BIOL 3140 (840:140) as a prerequisite for BIOL 4105/5105 (840:105g) and BIOL 4180/5180 (840:180g).
- \*\*\* \*\* The Earth and Environmental Sciences Department will accept GEOG 1210 (970:026) and GEOG 1211 as substitutes for courses that require EARTHSCI 1300 (870:031).
- \*\*\*\* \*\* The Earth and Environmental Sciences Department will waive the requirement of EARTHSCI 1320 (870:035) for EARTHSCI 3325/5325 (870:136g).
- # # 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 (870:031).  
EARTHSCI 3350/5350 (870:173g) has prerequisites of EARTHSCI 1300 (870:031); junior standing.  
GEOG 3220 (970:100) has a prerequisite of GEOG 1120 (970:010) or GEOG 1210 (970:026) or GEOG 2210 (970:028) or GEOG 1110 (970:040) or consent of instructor.  
ECON 3225/5225 (920:123g) has prerequisites of ECON 1041 (920:053), ECON 1051 (920:054); junior standing.  
ENGLISH 4785/5785 (620:177g) has prerequisites of ENGLISH 2770 (620:077); one of the following courses - INSTTECH 4170/5170 (240:170g), ART 3030 (600:125), ENGLISH 4765/5765 (620:102g), ENGLISH 4770/5770 (620:104g), ENGLISH 4775/5775 (620:105g), ENGLISH 4780/5780 (620:107g), or consent of instructor; junior standing.  
GEOG 4310/5310 (970:170g) has prerequisites of GEOG 3310 (970:164); junior standing.  
GEOG 4320/5320 (970:174g) has prerequisites of GEOG 3310 (970:164) or consent of instructor; junior standing.  
MGMT 3185 has a prerequisite of MGMT 3153 (150:153).  
POL AMER 3172/5172 (942:172) has prerequisites of POL AMER 1014 (942:014); POL AMER 1048 (942:048).  
GEOG 3179 (970:179) 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 (970:028)	Modern Climate Change: Evidence and Predictions	
GEOG 4170/5170 (970:168g)	Regional Analysis and Planning	
GEOG 3210 (970:137)	Natural Hazards and Disasters	
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	

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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</b> <b>9</b>	
BIOL 4167/5167 (840:167g)	Conservation Biology **
GEOG 4220/5220 (970:126g)	Soils and Landscapes
GEOG 4230/5230 (970:129g)	Rivers
GEOG 4250/5250 (970:185g)	Laboratory Methods in Environmental Geography
GEOG 4270/5270	Regional Landforms of North America
GEOG 4310/5310 (970:170g)	GIS Applications: (Variable Topic)
GEOG 4320/5320 (970:174g)	Geographic Information Systems II
GEOG 4370/5370 (970:173g)	Remote Sensing of the Environment
ENGLISH 4775/5775 (620:105g)	Applied Writing: Specialized Documents ^
or ENGLISH 4785/5785 (620:177g)	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 3172/5172 (942:172)	Public Budgeting ^
GEOG 3179 (970:179)	Cooperative Education in Geography ^
or BIOL 3179 (840:179)	Cooperative Education
or EARTHSCI 3430 (870:195)	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 (840:140) as a prerequisite for BIOL 4167/5167 (840:167g).

\*\* \*\* 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 (620:105g) has prerequisites of MGMT 2080 (150:080) or ENGLISH 2770 (620:077) or consent of instructor; junior standing. ENGLISH 4785/5785 (620:177g) has prerequisites of ENGLISH 2770 (620:077); one of the following courses - INSTTECH 4170/5170 (240:170g), ART 3030 (600:125), ENGLISH 4765/5765 (620:102g), ENGLISH 4770/5770 (620:104g), ENGLISH 4775/5775 (620:105g), ENGLISH 4780/5780 (620:107g), or consent of instructor; junior standing. MGMT 3185 has a prerequisite of MGMT 3153 (150:153). POL AMER 3172/5172 (942:172) has prerequisites of POL AMER 1014 (942:014); POL AMER 1048 (942:048). GEOG 3179 (970:179) 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 (920:053)	Principles of Macroeconomics	3
ECON 1051 (920:054)	Principles of Microeconomics	3
ECON 3225/5225 (920:123g)	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 (870:021)	Elements of Weather
EARTHSCI 1400	Introduction to Environmental Earth Science
EARTHSCI 3230/5230 (870:123g)	Air Quality ^
EARTHSCI 3345/5345 (870:171g)	Environmental Geology *
or	
GEOG 3220 (970:100)	Environmental Geography: Variable Topic

EARTHSCI 3350/535 Environmental Hydrology *	(870:173g)
<b>Secondary Focus - Cognates</b>	<b>7</b>
EARTHSCI 3240/524 Air Quality Modeling ^	(870:124g)
EARTHSCI 3250/525 Measurement and Analysis of Air Quality ** ^	(870:177g)
EARTHSCI 3325/532 Sedimentary Geology ***	(870:136g)
EARTHSCI 3355/535 Hydrogeology *	(870:175g)
GEOG 4220/5220 Soils and Landscapes	(970:126g)
GEOG 4230/5230 Rivers	(970:129g)
GEOG 4370/5370 Remote Sensing of the Environment	(970:173g)
PH 3710/5710 Environmental Health Science	
RTNL 4554/5554 Managing Recreation Impacts on the Natural Environment	
MGMT 3153 Organizational Management *	(150:153)
MGMT 3185 Project Management ^	
POL AMER 1048 Current and Emerging Issues in Public Administration	(942:048)
GEOG 3179 Cooperative Education in Geography ^	(970:179)
or BIOL 3179 Cooperative Education	(840:179)
or EARTHSCI 343 Internship	(870:195)
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 (970:026) and GEOG 1211 as a substitute for courses that require EARTHSCI 1300 (870:031).

\*\* The Earth and Environmental Sciences Department will waive EARTHSCI 3230/5230 (870:123g) as a prerequisite for enrollment into EARTHSCI 3250/5250 (870:177g).

\*\*\* The Earth and Environmental Sciences Department will waive the requirement for EARTHSCI 1320 (870:035) for EARTHSCI 3325/5325 (870:136g).

^ These courses have additional prerequisites as follows: GEOG 3220 (970:100) has a prerequisite of GEOG 1120 (970:010) or GEOG 1210 (970:026) or GEOG 2210 (970:028) or GEOG 1110 (970:040) or consent of instructor. EARTHSCI 3240/5240 (870:124g) has prerequisites of EARTHSCI 1200 (870:021); junior standing. EARTHSCI 3250/5250 (870:177g) has prerequisites of EARTHSCI 1200 (870:021); junior standing and a prerequisite or corequisite of EARTHSCI 3230/5230 (870:123g). MGMT 3185 has a prerequisite of MGMT 3153 (150:153). GEOG 3179 (970:179) 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 Liberal Arts Core requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

### Required

Geography:		
GEOG 1110 (970:040)	World Geography	3
GEOG 1120 (970:010)	Human Geography	3
GEOG 1210 (970:026)	Physical Geography	3
GEOG 1310 (970:061)	Digital Earth	3
GEOG 4550 (970:180)	Senior Seminar in Geography	3
GEOG 4560 (970:181)	Professional Seminar	1

### Concentrations (18-21 hrs)

Choose in consultation with a Geography faculty advisor. See below for course list and specific requirements for each area. Students must focus on one area; however, they may choose to add an additional concentration(s) to their program, which will be reflected on their transcripts. No more than 6 credit hours can be counted towards multiple concentrations.

### Concentration on Globalization and Regional Geography (18 hrs)

Professional and Regional Electives	
GEOG 3310 (970:164)	Geographic Information Systems I
GEOG 2210 (970:028)	Modern Climate Change: Evidence and Predictions
GEOG 3110 (970:101)	Economic Geography
GEOG 3120 (970:104)	North American Cities

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GEOG 3179 (970:179)	Cooperative Education in Geography
GEOG 3220 (970:100)	Environmental Geography: Variable Topic
GEOG 4270/5270	Regional Landforms of North America
GEOG 4110/5110 (970:111g)	Cultural Geography
GEOG 4120/5120 (970:119g)	Demography and Population Geography
GEOG 4150/5150 (970:141g)	Regional Geography: (Variable Topic)
GEOG 4160/5160 (970:151g)	Historical Geography: (Variable Topic)
GEOG 4250/5250 (970:185g)	Laboratory Methods in Environmental Geography
SOC 2020 (980:080) Statistics for Social Research	
Other Geography courses or courses from other departments as approved. Some non-Western cultures courses may be taken upon approval. They must be taken in addition to any LAC required non-Western cultures course.	
<b>Concentration on Environmental Systems &amp; Sustainability (21 hrs)</b>	<b>21</b>
<b>Methods Electives</b>	
Select three from the following:	
STAT 1772 (800:072)	Introduction to Statistical Methods
GEOG 3310 (970:164)	Geographic Information Systems I
GEOG 4310/5310 (970:170g)	GIS Applications: (Variable Topic)
GEOG 3179 (970:179)	Cooperative Education in Geography
GEOG 4250/5250 (970:185g)	Laboratory Methods in Environmental Geography
GEOG 4340/5340 (970:160g)	Spatial Data Analysis
<b>Professional Electives</b>	
Select four from the following:	
TECH 1015	Introduction to Sustainability
GEOG 2210 (970:028)	Modern Climate Change: Evidence and Predictions
GEOG 3220 (970:100)	Environmental Geography: Variable Topic
GEOG 4270/5270	Regional Landforms of North America
EARTHSCI 3355/5355 (870:175g)	Hydrogeology
GEOG 4220/5220 (970:126g)	Soils and Landscapes
GEOG 4230/5230 (970:129g)	Rivers
GEOG 3210 (970:137)	Natural Hazards and Disasters

GEOG 4240/5240 (970:155g)	The Ice Age
GEOG 4370/5370 (970:173g)	Remote Sensing of the Environment
EARTHSCI 3330/5330 (870:141g)	Geomorphology
<b>Concentration on Planning and Development (21 hrs)</b>	<b>21</b>
<b>Methods Electives</b>	
Select three from the following:	
STAT 1772 (800:072)	Introduction to Statistical Methods
SOC 2020 (980:080)	Statistics for Social Research
GEOG 4340/5340 (970:160g)	Spatial Data Analysis
GEOG 3310 (970:164)	Geographic Information Systems I
GEOG 4310/5310 (970:170g)	GIS Applications: (Variable Topic)
GEOG 3179 (970:179)	Cooperative Education in Geography
<b>Professional Electives</b>	
Select four from the following:	
GEOG 3110 (970:101)	Economic Geography
GEOG 3120 (970:104)	North American Cities
GEOG 3210 (970:137)	Natural Hazards and Disasters
GEOG 4180/5180 (970:121g)	Locational Analysis for Business
GEOG 4190/5190 (970:117g)	Transportation Planning and Policy
GEOG 4120/5120 (970:119g)	Demography and Population Geography
GEOG 4170/5170 (970:168g)	Regional Analysis and Planning
GEOG 4150/5150 (970:141g)	Regional Geography: (Variable Topic)
ECON 3249/5249 (920:143g)	Economic Development

Other Geography courses or courses from other  
departments as approved.

Total hours 34-37

\* These courses have additional prerequisites as follows:  
ECON 3249 has prerequisite of ECON 1041 and ECON  
1051.  
Other programs occasionally offer courses appropriate to  
the geography major. The Department of Geography will  
approve substituting up to two such courses for electives in  
Geography. Note that only 3 hours of credit in GEOG 3179  
(970:179) will count toward electives for the major.

## Minor Geography Minor

### Required

Geography:		
GEOG 1120 (970:010)	Human Geography	3
or GEOG 1110 (970:040)	World Geography	
GEOG 1210 (970:026)	Physical Geography	3
<b>Electives in geography*</b>		<b>12</b>
<b>Total Hours</b>		<b>18</b>

\* Only 3 hours of credit in GEOG 3179 (970:179) 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 [www.grad.uni.edu/admission](http://www.grad.uni.edu/admission).

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 32 semester hours**, including 6 hours GEOG 6299 (970:299) 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 (970:299). A **minimum of 38 semester hours**, including 3 hours GEOG 6598 (970:298) for completion of a research paper, is required for the **non-thesis** option. A **minimum of 17 hours of 200/6000-level course work is required for both the thesis and non-thesis options**. Any 200/6000-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 6000 (970:202)	Graduate Colloquium (1 hr; must be taken twice)	2
GEOG 6010 (970:294)	Geographic Research Methods	3
GEOG 6299 (970:299)	Research	6
GEOG 6550 (970:280)	Seminar (History of Geographic Thought )	3

<b>Electives*</b>	<b>18</b>
<b>Total Hours</b>	<b>32</b>

\* At least 12 of the 18 hours must be in geography; at least 3 of the 18 hours must be at the 200/6000-level; cannot include GEOG 6598 (970:298); additional hours of GEOG 6299 (970:299) cannot count toward the minimum 18 elective hours.

### Non-Thesis Option:

#### Required Geography

GEOG 6000 (970:202)	Graduate Colloquium (1 hr; must be taken twice)	2
GEOG 6010 (970:294)	Geographic Research Methods	3
GEOG 6550 (970:280)	Seminar (History of Geographic Thought )	3
GEOG 6598 (970:298)	Directed Research Project	3
<b>Electives*</b>		<b>27</b>
<b>Total Hours</b>		<b>38</b>

\* At least 15 of the 27 hours must be in geography; at least 6 of the 27 hours must be at the 200/6000-level; cannot include GEOG 6299 (970:299).

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 3310 (970:164)	Geographic Information Systems I	3
GEOG 4310/5310 (970:170g)	GIS Applications: (Variable Topic)	3
or GEOG 4335/5335	Web Mapping and GIS	
Sociology:		

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SOC 1000 (980:001)	Introduction to Sociology	3
SOC 2020 (980:080)	Statistics for Social Research	3
or STAT 1772 (800:072)	Introduction to Statistical Methods	

**Total Hours** **18**

### 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 3310 can be substituted with GEOG 6286 Studies in GIS.

#### Required

Geography:		
GEOG 3310 (970:164)	Geographic Information Systems I	3

or

GEOG 6286 (970:286) Studies in: GIS		
GEOG 4320/5320 (970:174g)	Geographic Information Systems II	3
GEOG 4360/5360 (970:165g)	Thematic Cartography	3

**Electives** **6**

Select two of the following:

Geography:		
GEOG 4310/5310 (970:170g)	GIS Applications: (Variable Topic)	
GEOG 4335/5335	Web Mapping and GIS	
GEOG 4340/5340 (970:160g)	Spatial Data Analysis	
GEOG 4350/5350 (970:175g)	Global Positioning System Field Survey Methods	
GEOG 4370/5370 (970:173g)	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 (970:286) (Studies in: Drones for Mapping and Communication)		
GEOG 4370/5370 (970:173g)	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 (970:170g)	GIS Applications: (Variable Topic)*	
GEOG 4350/5350 (970:175g)	Global Positioning System Field Survey Methods	
GEOG 4380/5380	Satellite Image Processing	
GEOG 4390/5390	GIS Programming*	
ANTH 3450 (990:172)	Archaeological Fieldwork*	
EARTHSCI 3345/534 (870:171g)	Environmental Geology*	
BIOL 4168/5168 (840:168g)	Ecology*	

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

\* These courses have prerequisites as follows:  
 GEOG 4310/5310 (970:170g) has prerequisites GEOG 3310 (970:164) and junior standing.  
 GEOG 4390/5390 has prerequisites GEOG 3310 (970:164) and GEOG 4310/5310 (970:170g) or GEOG 4320/5320 (970:174g) or consent of instructor.  
 ANTH 3450 (990:172) has prerequisite ANTH 1001 (990:010).  
 EARTHSCI 3345/5345 (870:171g) has prerequisites EARTHSCI 1300 (870:031) or equivalent and junior standing.  
 BIOL 4168/5168 (840:168g) has prerequisites BIOL 3100 (840:100) and BIOL 3140 (840:140) and junior standing.

### Courses

#### GEOG 1110 (970:040). World Geography — 3 hrs.

Reasons for and consequences of variations over surface of the earth of cultural, economic, physical, and other attributes of places. (Fall, Spring, Summer)

#### GEOG 1120 (970:010). Human Geography — 3 hrs.

Interaction between peoples and their environments. Spatial patterns and processes of population distribution, characteristics, and movement, human environmental impact, and economic activity. (Fall, Spring, Summer)

#### GEOG 1210 (970:026). Physical Geography — 3 hrs.

Explanation of patterns of solar energy receipt, atmospheric pressure, winds, and precipitation around the Earth. Emphasis on how solar energy, water, and crustal movements interact to determine characteristics of natural environments on Earth. Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. (Fall, Spring, Summer)

**GEOG 1211. Physical Geography Laboratory — 1 hr.**

Explanation of patterns of solar energy receipt, atmospheric pressure, winds, and precipitation around the Earth. Emphasis on how solar energy, water, and crustal movements interact to determine characteristics of natural environments on Earth. Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. Prerequisite(s) or corequisite(s): GEOG 1210 (970:026). (Fall and Spring)

**GEOG 1310 (970:061). Digital Earth — 3 hrs.**

Survey of maps and map communication principles with a focus on digital maps and dynamic mapping applications. Emphasis on reading, analysis, and interpretation of information on maps. (Fall)

**GEOG 2210 (970:028). Modern Climate Change: Evidence and Predictions — 3 hrs.**

Brief overview of the climate system. Examination of the evidence for recent global and regional climate changes. Analysis of the importance of greenhouse gases, solar changes, aerosols, and cloud changes as contributors to climate changes. (Fall)

**GEOG 2320. Drones for Mapping and Communication — 3 hrs.**

This course will provide an overview of aspects related to unmanned aerial systems (UAS) operations for both environmental mapping and communication purposes. Topics will include: Basic aviation knowledge, current UAS regulations, flight control systems, UAS platforms/sensors, basic aerial mapping techniques, and aerial photography/videography for communications. Students will engage in classroom and field exercises and will gain hands-on experience with data collection using a variety of UAS. Field trips are required. (Fall)

**GEOG 3110 (970:101). Economic Geography — 3 hrs.**

Analysis of changing spatial structure of the economy and inter-relationships between geography and economics within a global perspective. (Odd Springs)

**GEOG 3120 (970:104). North American Cities — 3 hrs.**

Principles of urban geography, including urban growth and change, structure and dynamics, and analysis and planning in North American cities. (Fall)

**GEOG 3179 (970:179). Cooperative Education in Geography — 1-3 hrs.**

Practical experience in business, industry, or a government agency. May be repeated for maximum of 3 hours. Offered on credit/no credit basis only. Prerequisite(s): 15 hours of geography at UNI; cumulative GPA of 2.50; junior standing; consent of department. (Fall, Spring, Summer)

**GEOG 3186 (970:186). Studies in (Variable Topics).**

Studies in (Variable Topics) (Variable)

**GEOG 3210 (970:137). Natural Hazards and Disasters — 3 hrs.**

Examination of causes, physical processes, and geographic distribution of natural hazards. Discussion of prediction methods and social impact of such disasters. (Spring)

**GEOG 3220 (970:100). Environmental Geography: Variable Topic — 3 hrs.**

Study of geographic dimension of human-environmental interaction. Historical perspectives on Earth's environmental problems, the place of humankind in ecological systems, and issues of sustainable development. May be repeated on different topics. Prerequisite(s): GEOG 1120 (970:010) or GEOG 1210 (970:026) or GEOG 2210 (970:028) or GEOG 1110 (970:040) or consent of instructor. (Variable)

**GEOG 3310 (970:164). Geographic Information Systems I — 3 hrs.**

Fundamental concepts and operations of Geographic Information Systems with applications. Lectures are supplemented by computer-based projects. Lecture, 2 periods; lab 2 periods. (Fall and Spring)

**GEOG 3580 (970:189). Readings in Geography — 1-3 hrs.**

Maximum of 3 hours can be applied toward Geography major. Prerequisite(s): consent of department head. (Fall, Spring, Summer)

**GEOG 3598 (970:193). Research Experience in Geography — 1-3 hrs.**

Conducting of supervised research or scholarly project. May be repeated for maximum of 6 hours. Prerequisite(s): 15 hours of geography; consent of instructor. (Fall, Spring, Summer)

**GEOG 4110/5110 (970:111g). Cultural Geography — 3 hrs.**

Examination of the nature and dynamics of culture relative to issues and landscapes that arise out of the interactions between people and their physical and human environments. Special emphasis on socio-economic development and the process of globalization. Prerequisite(s): junior standing. (Odd Springs)

**GEOG 4120/5120 (970:119g). Demography and Population Geography — 3 hrs.**

Geographic perspectives on demography and migration in a changing world. Patterns, processes, and models of population structure, change, distribution, and movement. Relationships with complex spatial mosaic of socioeconomic and environmental systems. Elements of population analysis and geodemographics. Prerequisite(s): junior standing. (Even Springs)

**GEOG 4150/5150 (970:141g). Regional Geography: (Variable Topic) — 3 hrs.**

Study of geography of selected region including evolution and dynamics of its cultural, social, economic, political, and environmental dimensions. May be repeated on different regions. Prerequisite(s): junior standing. (Variable)

**GEOG 4160/5160 (970:151g). Historical Geography: (Variable Topic) — 3 hrs.**

Examination of geographic development of selected region or of significance of geographic factors in historical development of selected topic. May be repeated on different regions or topics. Prerequisite(s): junior standing. (Variable)

**GEOG 4170/5170 (970:168g). Regional Analysis and Planning — 3 hrs.**

Introduction to processes, methods, and techniques of regional analysis and planning. Planning seen as political and technical process. Prerequisite(s): junior standing. (Spring)

**GEOG 4180/5180 (970:121g). Locational Analysis for Business — 3 hrs.**

Practical and theoretical use of geographic models and concepts in business. Locational analysis, site selection, market area analysis, and real estate evaluation. Prerequisite(s): junior standing. (Spring)

**GEOG 4190/5190 (970:117g). Transportation Planning and Policy — 3 hrs.**

Transportation policy goals and objectives, transportation planning processes, characteristics and problems of transportation systems. Use of current methodologies and techniques to support decision making related to transportation policy, operations, and management. Prerequisite(s): junior standing. (Fall)

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### **GEOG 4220/5220 (970:126g). Soils and Landscapes — 3 hrs.**

Study of soils as result of inter-relationships among climates, ecosystems, and landscapes of the world. Soil formation, distribution, properties, and classification, and applications of soil geography to other disciplines. Lecture, 2 periods; lab/field trips, 2 periods. Prerequisite(s): EARTHSCI 1300 (870:031) or GEOG 1210 (970:026); junior standing. (Odd Falls)

### **GEOG 4230/5230 (970:129g). Rivers — 3 hrs.**

Runoff processes, stream discharge, sediment transport, drainage basins, properties of alluvium, channel changes, floodplains, terraces, human adjustments to floods, human impacts on rivers, and river water quality. Prerequisite(s): junior standing. (Even Springs)

### **GEOG 4240/5240 (970:155g). The Ice Age — 3 hrs.**

Study of earth systems, long-term environmental change, and methods used to detect such change. Evidence of environmental changes resulting from glacial-interglacial conditions and how large scale changes in Earth climate systems affect environmental systems. Prerequisite(s): GEOG 1210 (970:026); GEOG 2210 (970:028); EARTHSCI 1300 (870:031) or consent of instructor; junior standing. (Even Falls)

### **GEOG 4250/5250 (970:185g). Laboratory Methods in Environmental Geography — 3 hrs.**

Intended to make students proficient in the common laboratory techniques used for analyzing soil and sediments for environmental geography. Prerequisite(s): EARTHSCI 1300 (870:031) or GEOG 1210 (970:026); junior standing. (Even Springs)

### **GEOG 4260. Environmental Resource Management — 3 hrs.**

This course provides an overview of issues and training in the accepted approaches to contemporary environmental management and sustainability, both in general and in the context of the state of Iowa. The objective of this course is to provide the theoretical background for critical analysis of resource management issues and applied problems in both for-profit and non-profit contexts, including but not limited to, government agencies, public park areas, public and private conservancies, and corporate environmental management contexts. Prerequisite(s): GEOG 1210 (970:026) or EARTHSCI 1300 (870:031); BIOL 2051 (840:051); or consent of instructor. (Fall)

### **GEOG 4270/5270. Regional Landforms of North America — 3 hrs.**

Description and explanation of various landforms of North America. Focus on structures and surface processes that form distinct physical regions of North America (e.g., Rocky Mountains), and kinds of landforms that make each region unique. Prerequisite(s): GEOG 1210 (970:026) or EARTHSCI 1300 (870:031); junior standing. (Odd Springs)

### **GEOG 4310/5310 (970:170g). GIS Applications: (Variable Topic) — 3 hrs.**

GIS techniques to conduct spatial analysis of social and environmental topics. Focus on an individual research project and associated functional capabilities of GIS packages. Variable social/environmental focus. May be taken more than once for credit. Prerequisite(s): GEOG 3310 (970:164); junior standing. (Spring)

### **GEOG 4320/5320 (970:174g). Geographic Information Systems II — 3 hrs.**

Technical issues in GIS and ways of implementing GIS as a decision support system for solving problems of a spatial nature in selected fields. Lecture, 2 periods; lab, 2 periods. Prerequisite(s): GEOG 3310 (970:164) or consent of instructor; junior standing. (Spring)

### **GEOG 4335/5335. Web Mapping and GIS — 3 hrs.**

An applied course examining state of the art web mapping and Geographic Information Systems server technologies. Students will gain hands on experience utilizing a variety of cloud-based technologies and simple scripting techniques to build web mapping applications and visualizations. Prior programming experience is not required. Prerequisite(s): GEOG 3310 (970:164). (Odd Falls)

### **GEOG 4340/5340 (970:160g). Spatial Data Analysis — 3 hrs.**

Analysis and interpretation of spatial point processes, area, geostatistical and spatial interaction data. Applications to geographic data in real estate, biology, environmental and agricultural sciences using S-Plus software. Prerequisite(s): STAT 1774 (800:064) or STAT 1772 (800:072) or SOC 2020 (980:080); junior standing. (Same as STAT 3778/5778 (800:171g)) (Odd Springs)

### **GEOG 4350/5350 (970:175g). Global Positioning System Field Survey Methods — 3 hrs.**

Utilization of global positioning system (GPS) to collect, process, and analyze geographic data. GPS theory and techniques including field survey experiences. Applications within an integrated geographic information system (GIS) framework. Prerequisite(s): junior standing. (Fall)

### **GEOG 4360/5360 (970:165g). Thematic Cartography — 3 hrs.**

Application of cartographic principles and techniques in compiling thematic maps. Emphasis on cartographic production; essentials of computer mapping and map reproduction. Lecture, 2 periods; lab, 2 periods. Prerequisite(s): junior standing. (Spring)

### **GEOG 4370/5370 (970:173g). Remote Sensing of the Environment — 3 hrs.**

Examination of physical basis of Remote Sensing and various sensing systems available for monitoring, mapping, measuring, and identifying phenomena on the earth's surface. Emphasis on non-photographic systems operating within the electromagnetic continuum. Various modes of multispectral scanning. Lecture, 2 periods; lab, 2 periods. Prerequisite(s): junior standing. (Fall)

### **GEOG 4380/5380. Satellite Image Processing — 3 hrs.**

Scientific and computational foundation of digital image processing techniques for extraction of earth resources information from remotely sensed satellite data. Prerequisite(s): GEOG 4370/5370 (970:173g); junior standing. (Even Springs)

### **GEOG 4385/5385. Advanced Unmanned Aerial Systems Mapping — 3 hrs.**

This class will provide an in-depth training on the uses of unmanned aerial systems (UAS) for environmental mapping. Topics will include: photogrammetry, advanced remote sensing, geospatial data accuracy, aerial photography survey design, and geospatial data processing/post-processing. Students will engage in classroom and field exercises and will gain hands-on experience with data collection using a variety of UAS. Field trips are required. Prerequisite(s): GEOG 4370/5370 (970:173g) or consent of instructor; junior standing. (Spring)

### **GEOG 4390/5390. GIS Programming — 3 hrs.**

An applied course in Python programming for ArcGIS automation and customization. Students will gain hands-on experience with ArcGIS Geoprocessing framework, basic programming concepts, Python fundamentals, and writing Python scripts for geoprocessing and map automation. Prior programming experience is not required. Prerequisite(s): GEOG 3310 (970:164) and 4310 or 4320 or consent of instructor. (Even Falls)

**GEOG 4530. Geography for Social Science Education — 3 hrs.**

This course is intended for secondary social science teaching majors to focus on geography. It will cover the geographic approach, foundational knowledge in geography (human, physical, and geospatial), the use of online GIS, and the application of this material in the K-12 education setting. Prerequisite(s): GEOG 1110 (970:040) or GEOG 1120 (970:010); GEOG 1210 (970:026). (Spring)

**GEOG 4550 (970:180). Senior Seminar in Geography — 3 hrs.**

Examination of specific topics through application of geographic principles and analysis. Discussion of readings during first half semester and student presentations during second half semester. Research paper required. Prerequisite(s): 21 hours of geography. (Spring)

**GEOG 4560 (970:181). Professional Seminar — 1 hr.**

Issues and opportunities involved in transition from undergraduate to professional life. Design and completion of essential documents including resume, professional portfolio, graduate program applications, and standardized examinations. Prerequisite(s): junior standing. (Fall)

**GEOG 6000 (970:202). Graduate Colloquium — 1 hr.**

Weekly presentations by a faculty member, visitor, or student. May be repeated for maximum of 2 hours. (Fall and Spring)

**GEOG 6010 (970:294). Geographic Research Methods — 3 hrs.**

The purpose of this course is to develop an appreciation for the process of research as practiced by contemporary professional geographers. Topics covered include formulating research problems, reviewing and critiquing published literature, developing and executing a research design, institutional review boards, funding programs, proposal writing and application, and completing a research project. (Spring)

**GEOG 6285 (970:285). Readings in Geography — 1-3 hrs.**

May be repeated. Prerequisite(s): consent of department head. (Fall, Spring, Summer)

**GEOG 6286 (970:286). Studies In: (Variable Topics).**

Studies In: (Variable Topics) (Variable)

**GEOG 6299 (970:299). Research.**

Prerequisite(s): consent of department. (Fall, Spring, Summer)

**GEOG 6550 (970:280). Seminar — 3 hrs.**

Topics listed in Schedule of Classes. May be repeated on different topics. (Variable)

**GEOG 6598 (970:298). Directed Research Project — 3 hrs.**

Research leading to research paper for students in the non-thesis option. Prerequisite(s): GEOG 6010 (970:294). (Fall, Spring, Summer)