

Department of Geography

(College of Social and Behavioral Sciences)

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. 1) (also listed in Department of Biology, Department of Earth and Environmental Sciences, and Department of Health, Recreation and Community Services)
- Geography (p. 6)

Minor

- Geography (p. 6)

Graduate Major (M.A.)

- Geography (p. 6)

Program Certificate

- Crime Mapping and Analysis (p. 7) (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 3380	Remote Sensing of the Environment	3
GEOG 3410	Geographic Information Systems II	3
GEOG 3450	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

Science and Mathematics

PHYSICS 1000	Physics in Everyday Life *	3
MATH 1130	Trigonometry *	2-4
or MATH 1140	Precalculus	

Statistics (Choose Two) 6

STAT 1772	Introduction to Statistical Methods	
SOC SCI 2020	Social Sciences Statistics	
GEOG 3778/5778	Spatial Data Analysis *	

Computer Science (Choose One) 3

GEOG 4390/5390	GIS Programming	
CS 3140/5140	Database Systems *	

Geography Electives 15

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.

Total Hours 59-63

- * These courses have additional prerequisites as follows:
 PHYSICS 1000 has prerequisite of student must have satisfied university entrance requirements in English and Mathematics.
 MATH 1130, MATH 1140 has prerequisites of satisfactory score on ALEKS exam.
 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

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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 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
Total Hours		31

* 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 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	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 3112	Invertebrate Zoology*	
BIOL 3118	Marine Biology*	
BIOL 3160	Field Zoology of Vertebrates*	
BIOL 3170	Entomology*	
BIOL 4157/5157	Biostatistics**	
BIOL 4164/5164	Mammalogy**	
BIOL 4166/5166	Plant Systematics**	
BIOL 4172/5172	Developmental Plant Anatomy**	

GEOG 4310/5310	GIS Applications: (Variable Topic)	
GEOG 3410	Geographic Information Systems II	

Category C - Cognates (pick at least 1 course)

EARTHSCI 1200	Elements of Weather	
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ENGLISH 4785/5785	Applied Writing: Projects, Grants and Careers [^]
GEOG 2210	Modern Climate Change: Evidence and Predictions
GEOG 2240	Natural Hazards and Disasters
GEOG 2270	Science of Scenery
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
GEOG 3220	Environmental Geography: Variable Topic [^]
GEOG 3380	Remote Sensing of the Environment
GEOG 4220/5220	Soils and Landscapes
GEOG 4240/5240	The Ice Age [^]
GEOG 4250/5250	Laboratory Methods in Environmental Geography
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

Total Hours **31-32**

* 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

Primary Focus - Content Related Courses 21

EARTHSCI 1200	Elements of Weather
EARTHSCI 3350/535	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 3345/534	Environmental Geology ^{***}
GEOG 4220/5220	Soils and Landscapes
GEOG 4230/5230	Rivers
GEOG 4250/5250	Laboratory Methods in Environmental Geography
GEOG 3380	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

Secondary Focus - Management Cognates 9

BIOL 4105/5105	Wildlife Ecology and Management ^{**}
BIOL 4180/5180	Restoration Ecology ^{**}
EARTHSCI 3325/5325	Sedimentary Geology ^{****}
EARTHSCI 3360/536	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 2270	Science of Scenery

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GEOG 4310/5310	GIS Applications: (Variable Topic) [^]
GEOG 3410	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	
Total Hours	30

- * For students pursuing the Geosystems Track, the Geography Department will accept GEOG 1210 and GEOG 1211 or EARTHSCI 1300 as the prerequisite for enrollment into all listed Geography courses except GEOG 4310/5310 and GEOG 3410.
- ** 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 3410 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 4170/5170	Climate Action Planning	
GEOG 2240	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	
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	
Secondary Focus - Cognates		9
BIOL 4167/5167	Conservation Biology ^{**}	
GEOG 4220/5220	Soils and Landscapes	
GEOG 4230/5230	Rivers	
GEOG 4250/5250	Laboratory Methods in Environmental Geography	
GEOG 2270	Science of Scenery	
GEOG 4310/5310	GIS Applications: (Variable Topic)	
GEOG 3410	Geographic Information Systems II	
GEOG 3380	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	

Total Hours **30**

- * * 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 3380	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	Current and Emerging Issues in Public Administration	
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		

Total Hours **32**

- * * 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.

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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.		
Total Hours		40

Minor

Geography Minor

Required

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

* 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 36 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
Electives *		21
Total Hours		33

* 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 6010	Geographic Research Methods	3
GEOG 6550	Seminar (History of Geographic Thought)	3
GEOG 6598	Directed Research Project	3
Electives *		27
Total Hours		36

* At least 15 of the 27 hours must be in geography; at least 6 of the 27 hours must be at the 6000-level; cannot include GEOG 6299.

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 GIS	
Sociology:		
SOC 1000	Introduction to Sociology	3
SOC SCI 2020	Social Sciences Statistics	3
	or STAT 1772 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 2410 can be substituted with GEOG 6286 Studies in GIS.

Required

Geography:		
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GEOG 2410	Geographic Information Systems I	3
or		
GEOG 6286 Studies in: GIS		
GEOG 3410	Geographic Information Systems II	3
GEOG 2420	Cartographic Design	3
Electives		6
Select two of the following:		
Geography:		
GEOG 4310/5310	GIS Applications: (Variable Topic)	
GEOG 4335/5335	Web Mapping and GIS	
GEOG 3778/5778	Spatial Data Analysis	
GEOG 3450	Global Positioning System Field Survey Methods	
GEOG 3380	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 3380	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 3450	Global Positioning System Field Survey Methods	
GEOG 4380/5380	Satellite Image Processing	
GEOG 4390/5390	GIS Programming *	
ANTH 3450	Archaeological Fieldwork *	
EARTHSCI 3345/534	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 3410 or consent of instructor.
 ANTH 3450 has prerequisite ANTH 1001.
 EARTHSCI 3345/5345 has prerequisites EARTHSCI 1300 or equivalent and junior standing.

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

Geographic Information Science, B.S.

Communication

SLO 3: Demonstrate effective written and oral communication skills related to geographic knowledge.

Critical Thinking

SLO 2: Demonstrate abilities in critical thinking and intellectual synthesis including synthesis of Geography's multidisciplinary focus. This includes, but is not limited to, examples of human-environmental interaction, location theory, and transition models along with their past, present, and future impacts.

SLO 4: Display evidence of professional, career skills such as independent problem solving, exhibiting professional judgment, and dependability.

SLO 5: Conduct research through the development of a research question, identification and integration of relevant literature, select appropriate research methods, and execution of data collection, analysis, and interpretation.

Content Knowledge & Skills

SLO 1: Identify patterns and processes of spatial relationships and interactions, movement, diffusion, and scale to explain their causes and significance, and to understand analytical methods to study them.

Geography, B.A.

Communication

SLO 3: Demonstrate effective written and oral communication skills related to geographic knowledge.

Critical Thinking

SLO 2: Demonstrate abilities in critical thinking and intellectual synthesis including synthesis of Geography's multidisciplinary focus. This includes, but is not limited to, examples of human-environmental interaction, location theory, and transition models along with their past, present, and future impacts.

SLO 4: Display evidence of professional, career skills such as independent problem solving, exhibiting professional judgment, and dependability.

SLO 5: Conduct research through the development of a research question, identification and integration of relevant literature, select appropriate research methods, and execution of data collection, analysis, and interpretation.

Content Knowledge & Skills

SLO 1: Identify patterns and processes of spatial relationships and interactions, movement, diffusion, and scale to explain their causes and significance, and to understand analytical methods to study them.

Environmental Resource Management: Ecosystems, B.A.

Goals: Students will gain an understanding of major themes in biology related to ecosystems (organization of life, diversity and its causes) along with deeper exposure to and advanced competency in topics related to ecosystems and their management. Students will be able to think critically and communicate effectively on these discipline-specific topics.

Outcomes:

1. Students show proficiency in advanced content from the fields of ecology, evolution, and organismal biology that will allow students to evaluate issues important to modern ecosystem management.
2. Students will communicate effectively using discipline-specific vocabulary and standard written and oral scientific communication skills.
3. Students will think critically about discipline-specific content as evidenced by an ability to interpret data, to effectively critique arguments, and/or to solve problems relating to natural systems.

Environmental Resource Management: Environmental Compliance, B.A.

Communication

SLO 3: Demonstrate effective written and oral communication skills related to geographic knowledge.

Critical Thinking

SLO 2: Demonstrate abilities in critical thinking and intellectual synthesis including synthesis of Geography's multidisciplinary focus. This includes, but is not limited to, examples of human-environmental interaction, location theory, and transition models along with their past, present, and future impacts.

SLO 4: Display evidence of professional, career skills such as independent problem solving, exhibiting professional judgment, and dependability.

SLO 5: Conduct research through the development of a research question, identification and integration of relevant literature, select appropriate research methods, and execution of data collection, analysis, and interpretation.

Content Knowledge & Skills

SLO 1: Identify patterns and processes of spatial relationships and interactions, movement, diffusion, and scale to explain their causes and significance, and to understand analytical methods to study them.

Environmental Resource Management: Geosystems, B.A.

Goal 1 - Critical Thinking & Data Analysis: Our students will use concepts from Earth, Space, or Environmental Science to critically analyze and interpret scientific data.

By the time they graduate, our students will be able to:

Outcome 1.1 - Analyze and interpret scientific data to formulate an evidence-based conclusion

Outcome 1.2 - Use a variety of mathematical tools and computer software to describe scientific phenomena and answer scientific questions

Goal 2 - Communication: Our students will be able to communicate concepts from Earth, Space, or Environmental Science.

By the time they graduate, our students will be able to:

Outcome 2.1 - Create a well-written report or paper that summarizes scientific data and draws evidence-based conclusions

Outcome 2.2 - Create and deliver a well-constructed oral report that summarizes scientific data and draws evidence-based conclusions

Goal 3 - Content Knowledge and Skills: Our students will apply concepts and theories from Earth, Space, or Environmental Science to the real world.

By the time they graduate, our students will be able to:

Outcome 3.1 - Describe fundamental theories and concepts in Earth, Space, or Environmental Science

Outcome 3.2 - Use concepts and theories from Earth, Space, or Environmental Science to create a model of a complex system

Outcome 3.3 - Use concepts and theories from Earth, Space, or Environmental Science to solve a real-world problem

Outcome 3.4 - Use scientific equipment to collect valid scientific data.

Environmental Resource Management: Resource Administration, B.A.

Communication

SLO 3: Demonstrate effective written and oral communication skills related to geographic knowledge.

Critical Thinking

SLO 2: Demonstrate abilities in critical thinking and intellectual synthesis including synthesis of Geography’s multidisciplinary focus. This includes, but is not limited to, examples of human-environmental interaction, location theory, and transition models along with their past, present, and future impacts.

SLO 4: Display evidence of professional, career skills such as independent problem solving, exhibiting professional judgment, and dependability.

SLO 5: Conduct research through the development of a research question, identification and integration of relevant literature, select appropriate research methods, and execution of data collection, analysis, and interpretation.

Content Knowledge & Skills

SLO 1: Identify patterns and processes of spatial relationships and interactions, movement, diffusion, and scale to explain their causes and significance, and to understand analytical methods to study them.

Geography: M.A.

Goal 1: Communication

SLO 1: Demonstrate an advanced development in effective communication of new knowledge.

Goal 2: Critical Thinking

SLO 2: Conduct advanced research through the development of a research question, select appropriate research methods, and execution of suitable methods of data collection.

Goal 3: Content Knowledge & Skills

SLO 3: Acquire an awareness of the discipline of geography as a professional field including an understanding of the social importance of geographic knowledge and research.

SLO 4: Develop a mastery of a specialized field within the discipline of geography.

Environmental Resource Management: Ecosystems, B.A.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

Course	Title	Hour
Freshman		
Fall		
BIOL 2051	General Biology: Organismal Diversity	4
EARTHSCI 1300	Introduction to Geology (or GEOG 1210 Physical Geography and GEOG 1211 Physical Geography Lab)	4
STAT 1772	Introduction to Statistical Methods	3
UNIFI/General Education or University Electives		3
Hours		14
Spring		
CHEM 1110	General Chemistry I	4
GEOG 2410	Geographic Information Systems I	3
UNIFI/General Education or University Electives		6
Hours		13
Sophomore		
Fall		
BIOL 3100	Evolution, Ecology and the Nature of Science	3
GEOG 2260	Environmental Resource Management	3
CHEM 1120	General Chemistry II	4
UNIFI/General Education or University Electives		3
Hours		13
Spring		
Major Electives		4
UNIFI/General Education or University Electives		12
Hours		16
Junior		
Fall		
BIOL 4168/5168	Ecology	4
EARTHSCI 3330/5330	Geomorphology	4

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RTNL 4320	Financial Resource Management in Recreation, Tourism and Nonprofit Leadership	3
UNIFI/General Education or University Electives		3
Hours		14
Spring		
HIST 4170/5170	U.S. Environmental History	3
Major Electives		4
UNIFI/General Education or University Electives		9
Hours		16
Senior		
Fall		
Major Electives		8
UNIFI/General Education or University Electives		9
Hours		17
Spring		
Major Electives		4
UNIFI/General Education or University Electives		13
Hours		17
Total Hours		120

Environmental Resource Management: Environmental Compliance, B.A.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

Course	Title	Hour
Freshman		
Fall		
BIOL 2051	General Biology: Organismal Diversity	4
EARTHSCI 1300	Introduction to Geology (or GEOG 1210 Physical Geography and GEOG 1211 Physical Geography Lab)	4
UNIFI/General Education or University Electives		6
Hours		14
Spring		
CHEM 1110	General Chemistry I	4
GEOG 2410	Geographic Information Systems I	3
UNIFI/General Education or University Electives		9
Hours		16
Sophomore		
Fall		
BIOL 3100	Evolution, Ecology and the Nature of Science	3
GEOG 2260	Environmental Resource Management	3
UNIFI/General Education or University Electives		9
Hours		15
Spring		
Major Electives		10
UNIFI/General Education or University Electives		6
Hours		16
Junior		
Fall		
EARTHSCI 3330/5330	Geomorphology	4

RTNL 4320	Financial Resource Management in Recreation, Tourism and Nonprofit Leadership	3
UNIFI/General Education or University Electives		9
Hours		16
Spring		
HIST 4170/5170	U.S. Environmental History	3
Major Electives		6
UNIFI/General Education or University Electives		6
Hours		15
Senior		
Fall		
Major Electives		9
UNIFI/General Education or University Electives		6
Hours		15
Spring		
Major Electives		7
UNIFI/General Education or University Electives		6
Hours		13
Total Hours		120

Environmental Resource Management: Geosystems, B.A.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

Course	Title	Hour
Freshman		
Fall		
BIOL 2051	General Biology: Organismal Diversity	4
EARTHSCI 1300	Introduction to Geology (or GEOG 1210 Physical Geography and GEOG 1211 Physical Geography Lab)	4
UNIFI/General Education or University Electives		6
Hours		14
Spring		
CHEM 1110	General Chemistry I	4
GEOG 2410	Geographic Information Systems I	3
UNIFI/General Education or University Electives		9
Hours		16
Sophomore		
Fall		
BIOL 3100	Evolution, Ecology and the Nature of Science	3
GEOG 2260	Environmental Resource Management	3
UNIFI/General Education or University Electives		9
Hours		15
Spring		
Major Electives		9
UNIFI/General Education or University Electives		6
Hours		15
Junior		
Fall		
EARTHSCI 3330/5330	Geomorphology	4

RTNL 4320	Financial Resource Management in Recreation, Tourism and Nonprofit Leadership	3
UNIFI/General Education or University Electives		9
Hours		16
Spring		
HIST 4170/5170	U.S. Environmental History	3
Major Electives		6
UNIFI/General Education or University Electives		6
Hours		15
Senior		
Fall		
Major Electives		9
UNIFI/General Education or University Electives		6
Hours		15
Spring		
Major Electives		6
UNIFI/General Education or University Electives		8
Hours		14
Total Hours		120

RTNL 4320	Financial Resource Management in Recreation, Tourism and Nonprofit Leadership	3
UNIFI/General Education or University Electives		9
Hours		16
Spring		
HIST 4170/5170	U.S. Environmental History	3
Major Electives		6
UNIFI/General Education or University Electives		6
Hours		15
Senior		
Fall		
Major Electives		9
UNIFI/General Education or University Electives		6
Hours		15
Spring		
Major Electives		6
UNIFI/General Education or University Electives		8
Hours		14
Total Hours		120

Environmental Resource Management: Resource Administration, B.A.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

Course	Title	Hour
Freshman		
Fall		
BIOL 2051	General Biology: Organismal Diversity	4
EARTHSCI 1300	Introduction to Geology (or GEOG 1210 Physical Geography and GEOG 1211 Physical Geography Lab)	4
UNIFI/General Education or University Electives		6
Hours		14
Spring		
CHEM 1110	General Chemistry I	4
GEOG 2410	Geographic Information Systems I	3
UNIFI/General Education or University Electives		9
Hours		16
Sophomore		
Fall		
BIOL 3100	Evolution, Ecology and the Nature of Science	3
GEOG 2260	Environmental Resource Management	3
UNIFI/General Education or University Electives		9
Hours		15
Spring		
Major Electives		9
UNIFI/General Education or University Electives		6
Hours		15
Junior		
Fall		
EARTHSCI 3330/5330	Geomorphology	4

Courses

GEOG 1110. Global Geography — 3 hrs.

Global geography is the study of people, places and the connections between them. How people give meaning and character to different places, and how the growing level of interdependence between those places shape and reshape the cultural, political, economic, and environmental nature of individual societies and global society as a whole. (Fall, Spring, Summer)

GEOG 1120. Peoples, Cultures, and Environments — 3 hrs.

Spatial perspectives on the dynamics of socio-cultural and human-environmental interactions, including processes, patterns, and systems examined from local to global scales of analysis. Through these perspectives, the course examines global human diversity and commonality via topics that include globalization, culture, population, sustainability and economies, while incorporating theories, findings, and works that illuminate the human condition. (Fall, Spring, Summer)

GEOG 1210. Planet Earth — 3 hrs.

We live in a swiftly changing world characterized by rapidly changing climates, shifting landscapes, growing human populations with degrading soil and water resources. Now, more than ever, it is essential to understand how Earth systems work, how they affect our livelihoods, and how we are altering them. The course has three objectives: 1) to provide a basic understanding of the most important processes shaping the Earth's physical systems; 2) to convince you of the dynamic nature of these systems, in part because of human activity; and 3) to help you understand the environmental systems of particular places so that you might use this background to explore these further and see how they change over time. Many students take this course to fulfill a LAC requirement. Others use it as a gateway to majors and careers in Geography, Natural Resources Management, and Environmental Science. (Fall, Spring, Summer)

GEOG 1211. Planet Earth Laboratory — 1 hr.

We live in a swiftly changing world characterized by rapidly changing climates, shifting landscapes, growing human populations with degrading soil and water resources. Now, more than ever, it is essential to understand how Earth systems work, how they affect our livelihoods, and how we are altering them. This laboratory course compliments and enhances students understanding of the content and scientific reasoning skills presented in GEOG 1210 through a

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series of applied laboratory activities. Prerequisite(s) or corequisite(s): GEOG 1210. (Fall and Spring)

GEOG 1310. 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 2120. 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 2210. 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 2240. 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 2250. Nature-Society Relations — 3 hrs.

There is no relationship more fundamental to society than the one we have with our natural environment. This introductory course will explore human society's connection to food systems, climate change, urbanization and extinctions, while connecting local-scale phenomena with regional-, national-, and global-scale processes. (Spring)

GEOG 2260. 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 or EARTHSCI 1300; BIOL 2051; or consent of instructor. (Fall)

GEOG 2270. Science of Scenery — 3 hrs.

Exploring the core concepts of geomorphology and biogeography in the context of the landscapes of North American national parks and protected places. Prerequisite(s): GEOG 1210 or EARTHSCI 1300. (Odd Springs)

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 2350. Intro to Environmental Data Analysis — 3 hrs.

Scientific computing is becoming a core component of many earth and environmental sciences. This course focuses on the application scientific computing principles to analyze and visualize environmental data. Analysis tasks will range from basic data processing to full statistical analysis. For this course we will be using Python, a widely used, open source, general-purpose, and high-level programming

language. It is easy to read and easy to learn. Python is increasingly being used for data analysis in scientific research for everything from basic statistics to complex computer models. No prior programming skills/experience are needed. (Even Springs)

GEOG 2410. 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 2420. Cartographic Design — 3 hrs.

Application of cartographic principles and techniques in compiling thematic maps. Emphasis on cartographic production including the use of map projections, data characterization and symbolization, graphing, color use, typographic and design elements, and thematic mapping techniques. (Spring)

GEOG 2450. 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. (Variable)

GEOG 3110. 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 3179. 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. Studies in (Variable Topics).

Studies in (Variable Topics) (Variable)

GEOG 3220. 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 or GEOG 1210 or GEOG 2210 or GEOG 1110 or consent of instructor. (Variable)

GEOG 3380. 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. (Fall)

GEOG 3410. 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 2410 or consent of instructor; junior standing. (Spring)

GEOG 3450. 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. (Fall)

GEOG 3580. 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. 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 3778/5778. 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 or STAT 1772 or SOC SCI 2020; junior standing. (Same as STAT 3778/5778) (Odd Springs)

GEOG 4110/5110. 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 4115/5115. Climate Change and Social Justice — 3 hrs.

This is a participatory action research focused class where students engage in research on climate change social justice issues in and around Iowa. Prerequisite(s): junior standing. (Fall)

GEOG 4120/5120. 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 4170/5170. Climate Action Planning — 3 hrs.

An introduction to the urban planning process, with a focus on climate action planning. The course includes a discussion of climate action best practices from cities around the world, as well as opportunities for actual community engagement in Iowa cities and towns to develop strategies for greenhouse gas reduction and other practices to enhance sustainability. Prerequisite(s): junior standing. (Spring)

GEOG 4220/5220. 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 or GEOG 1210; junior standing. (Odd Falls)

GEOG 4230/5230. 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. 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; GEOG 2210; EARTHSCI 1300 or consent of instructor; junior standing. (Even Falls)

GEOG 4250/5250. 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 or GEOG 1210; junior standing. (Even Springs)

GEOG 4310/5310. 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 2410; 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 1310 or GEOG 2410 or consent of instructor; junior standing. (Odd Falls)

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 3380; 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 3380 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 2410 or consent of instructor; junior standing. (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 or GEOG 1120; GEOG 1210. (Spring)

GEOG 4550. 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. Professional Seminar — 1 hr.

Issues and opportunities involved in transition from undergraduate to professional life. Design and completion of essential documents

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including resume, professional portfolio, graduate program applications, and standardized examinations. Prerequisite(s): junior standing. (Fall)

GEOG 5150. 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. (Fall and Spring)

GEOG 5270. Science of Scenery — 3 hrs.

Exploring the core concepts of geomorphology and biogeography in the context of the landscapes of North American national parks and protected places. Prerequisite(s): GEOG 1210 or EARTHSCI 1300. (Odd Springs)

GEOG 5320. 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 2410 or consent of instructor; junior standing. (Spring)

GEOG 5350. 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. (Fall)

GEOG 5360. Cartographic Design — 3 hrs.

Application of cartographic principles and techniques in compiling thematic maps. Emphasis on cartographic production including the use of map projections, data characterization and symbolization, graphing, color use, typographic and design elements, and thematic mapping techniques. (Fall)

GEOG 5370. 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. (Fall)

GEOG 6000. 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. 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. Readings in Geography — 1-3 hrs.

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

GEOG 6286. Studies In: (Variable Topics).

Studies In: (Variable Topics) (Variable)

GEOG 6299. Research.

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

GEOG 6550. Seminar — 3 hrs.

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

GEOG 6598. Directed Research Project — 3 hrs.

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