Geography, B.S.

Requirements

The Bachelor of Science with a major in geography requires a minimum of 120 s.h., including at least 45-48 s.h. of work for the major. Credit required for the major depends on a student's choice of track. Students must maintain a g.p.a. of at least 2.00 in all courses for the major and in all UI courses for the major. They also must complete the College of Liberal Arts and Sciences General Education Program. Transfer students must earn a minimum of 15 s.h. for the major in residence at the University of Iowa.

Geography majors may not earn the minor in geographic information science.

The major in geography is appropriate preparation for advanced training or careers in geographical and sustainability sciences. Students with strong interest in quantitative analysis and model building should pursue the Bachelor of Science and are encouraged to master an appropriate computer programming language.

Students choose one of three tracks in the major: environmental studies, geographic information science (GISci), or health and society. All students majoring in geography complete a common set of foundation courses in addition to the requirements for their choice of track. Bachelor of Science students take additional mathematics course work.

Consistent with the College of Liberal Arts and Sciences maximum semester hours rule, students may count a maximum of 56 s.h. earned in their major department toward graduation.

The B.S. with a major in geography requires the following work.

Common Requirements 17-22
Statistics, Mathematics or Computer Science Courses 10
Track Courses 15-19

Common Requirements

Students may not use a course to fulfill more than one major requirement.

One of these:
GEOG:1010 Introduction to Human Geography 3
GEOG:1090 Globalization and Geographic Diversity 3

All of these:
GEOG:1020 The Global Environment 3
GEOG:1021 The Global Environment Lab 1
GEOG:1050 Foundations of GIS 3

One of these:
GEOG:1060 Geography of Asia: From Japan to Pakistan 3
GEOG:1070 Contemporary Environmental Issues 3
GEOG:1090 Globalization and Geographic Diversity (if not chosen above) 3

GEOG:2110/ GHS:2110 Seven Billion and Counting: Introduction to Population Dynamics 3
GEOG:2130 World Cities 3
GEOG:2910 The Global Economy 3
GEOG:2950 Environmental Conservation 3
One of these (not required for GISci track students):
GEOG:3340 Ecosystem Services: Human Dependence on Natural Systems 3
GEOG:3500 Introduction to Environmental Remote Sensing 3
GEOG:3520 GIS for Environmental Studies 3
GEOG:3540 Introduction to Geographic Visualization 3
GEOG:3560 Spatial Analyses of Wind Energy 3
GEOG:3570 Light Detection and Ranging (LiDAR): Principles and Applications 3
GEOG:4010 Field Methods in Physical Geography 3
GEOG:4020 Field Methods: Mapping and Mobile Computing 3
GEOG:4150/ GHS:4150 Health and Environment: GIS Applications 3
GEOG:4650 Simulation in Environmental Geography 3
One of these:
GEOG:4030 Senior Project Seminar (offered only in spring semesters) 3
GEOG:4995 Honors Thesis (must enroll for 3 s.h. and make arrangements with a faculty advisor) 3
One of these (at least 1 s.h. required):
GEOG:3400 Iowa Environmental Policy in Practice 3
GEOG:3992 Undergraduate Research (including ICIGO or independent research) arr.
CCP:1201 Academic Internship 1-3

Senior Project Seminar (GEOG:4030) is offered only in spring semesters. Students who choose GEOG:4995 Honors Thesis must make arrangements with a faculty advisor.

The Department of Geographical and Sustainability Sciences is a participant in the University's internship program, which provides opportunities for students to participate in paid and unpaid activities related to their academic programs. The Pomerantz Career Center works with students to develop appropriate internships.

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Statistics, Mathematics or Computer Science Courses

Students must earn a minimum of 10 s.h. in statistics, mathematics or computer science course work by completing the following. Equivalent courses and courses with a higher course number also may be selected in consultation with, and approval by an advisor.

Students who complete the GIS track may not double count their required computer science courses for the statistics, mathematics or computer science courses requirement.

Both of these:

- STAT:2010 Statistical Methods and Computing 3
- STAT:3200/IE:3760/IGPI:3200 Applied Linear Regression 3

One of these:

- CS:1210 Computer Science I: Fundamentals 4
- CS:2110 Programming for Informatics 4
- CS:2230 Computer Science II: Data Structures 4
- MATH:1460 Calculus for the Biological Sciences 4
- MATH:1380 Calculus and Matrix Algebra for Business 4

Tracks

All geography majors must complete one of the three tracks described below: environmental studies, geographic information science (GIsci), or health and society. Students should pay close attention to prerequisites for the upper-level courses in each track in order to develop a study plan that allows them to complete their major in a timely way.

Students in the environmental studies or health and society track who wish to gain additional experience in theory and application of GIS systems should take GEOG:3520 GIS for Environmental Studies and GEOG:4520 GIS for Environmental Studies: Applications, or they should earn 6 s.h. in other GIS-based geographical and sustainability sciences courses.

In addition to the common requirements, students in the environmental studies track complete a common track course (3 s.h.) and at least 12 s.h. of upper-level geographical and sustainability sciences courses.

Common course—all environmental studies track students take this:

- GEOG:1070 Contemporary Environmental Issues 3

Students choose a total of four upper-level courses (at least 12 s.h.) from the following, in consultation with their advisor. Those who wish to gain additional experience in theory and application of GIS systems should take GEOG:3520 GIS for Environmental Studies and GEOG:4520 GIS for Environmental Studies: Applications, or they should earn 6 s.h. in other GIS-based geographical and sustainability sciences courses.

At least one of these:

- GEOG:2310/ EES:2310 Introduction to Climatology 3
- GEOG:2374/ BIOL:2374 Biogeochemistry 3
- GEOG:2410 Environment and Development 3
- GEOG:2930 Water Resources 3
- GEOG:3500 Introduction to Environmental Remote Sensing 3
- GEOG:3520 GIS for Environmental Studies 3

At least one of these:

- GEOG:3310 Landscape Ecology 3
- GEOG:3320/ EES:3260 Wetlands: Function, Geography, and Management 3
- GEOG:3340 Ecosystem Services: Human Dependence on Natural Systems 3
- GEOG:3350 Urban Ecology 3
- GEOG:3400 Iowa Environmental Policy in Practice 3
- GEOG:3560 Spatial Analyses of Wind Energy 3
- GEOG:3750 Environmental Quality: Science, Technology, and Policy 3
- GEOG:3760/ GHS:3760 Hazards and Society 3
- GEOG:3920/ URP:3001 Planning Livable Cities 3
- GEOG:4010 Field Methods in Physical Geography 3
- GEOG:4500 Applications in Environmental Remote Sensing 4
- GEOG:4520 GIS for Environmental Studies: Applications 3
- GEOG:4650 Simulation in Environmental Geography 3
- GEOG:4750/ URP:4750 Environmental Impact Analysis 4

Environmental Studies Track

The environmental studies track requires a minimum of 15 s.h. It is designed for students interested in the interrelationships among social and natural processes that affect the environment. The track prepares students for careers or pursuit of personal interests in resource management, landscape ecology, water resources, environmental policy or law, global environmental change, sustainable development, or other complex environmental issues. Graduates may find employment in an environmental profession such as conservation, environmental planning and regulation, or environmental law, policy, and politics.

The environmental studies track offers training in field observation, remote sensing, geographical information systems, quantitative analysis/computing, and cartographic representation. It also provides a sound foundation for graduate or professional-level studies in the natural or social aspects of the environment.
**Geographic Information Science Track**

The geographic information science track (GiSci) requires a minimum of 18-19 s.h. It is designed for students preparing for positions in government agencies, nongovernment organizations, international development agencies, and business. It also provides preparation for graduate study in geography, planning, and other disciplines. The track focuses on the design, implementation, and use of geographic information systems. Courses address how geographic data are acquired, stored, accessed, displayed, managed, and analyzed.

Students in the geographic information science track learn to address problems involved in modeling environmental systems, identifying the best locations for service facilities, assessing environmental impacts, and forecasting the populations of small areas. They use the department’s Geographical Information Systems Instructional Lab (GISIL) extensively to develop expertise in using GIS software.

Course work in the track covers methods of spatial analysis and geographical modeling and involves database management and computer programming.

In addition to the common requirements, students in the geographic information science track complete a common track course (3-4 s.h.) and at least 15 s.h. of upper-level geographical and sustainability sciences courses.

**Common course—all GiSci track students take one of these:**

- **CS:1110** Introduction to Computer Science 3
- **CS:1210** Computer Science I: Fundamentals 4
- **CS:2110** Programming for Informatics 4

Students choose a total of five upper-level courses (at least 15 s.h.) from the following, in consultation with their advisor. GiSci track students are encouraged to add breadth to their degree by taking additional upper-level courses in the department. Students interested in the application of GIS to environmental issues should select additional courses from the department’s environmental studies area; those interested in health or other socioeconomic issues should select additional courses from the department’s health and society area.

At least one of these:

- **GEOG:3500** Introduction to Environmental Remote Sensing 3
- **GEOG:3520** GIS for Environmental Studies 3
- **GEOG:3540** Introduction to Geographic Visualization 3
- **GEOG:4650** Simulation in Environmental Geography 3

At least one of these:

- **GEOG:4500** Applications in Environmental Remote Sensing 4
- **GEOG:4520** GIS for Environmental Studies: Applications 3
- **GEOG:4570** Spatial Analysis and Location Models 3
- **GEOG:4580** Introduction to Geographic Databases 3

At least one of these:

- **GEOG:3340** Ecosystem Services: Human Dependence on Natural Systems 3
- **GEOG:3560** Spatial Analyses of Wind Energy 3
- **GEOG:3760** Hazards and Society 3
- **GEOG:4010** Field Methods in Physical Geography 3
- **GEOG:4020** Field Methods: Mapping and Mobile Computing 3
- **GEOG:4150** Health and Environment: GIS Applications 3

**Health and Society Track**

The health and society track requires a minimum of 15 s.h. It is designed for students interested in understanding the causes and consequences of social inequalities, the long-term effects that changing human/environmental interactions have on human health, and emerging transnational challenges to the sustainability of livelihoods. The track provides students with foundational knowledge and skills to support postgraduate employment in governmental or nongovernmental positions, graduate study in public health or in health-related fields, and service experiences such as the Peace Corps and AmeriCorps.

Students gain understanding of the factors and processes that determine geographic patterns of health. They explore the effects of the social, built, and natural environments on the physical, social, and mental health of populations. Course work in the track examines patterns and causes of infectious and chronic diseases; hazards, vulnerability, and environmental justice; and the spatial methods used to understand such issues.

Thematic content from courses is complemented by quantitative, spatial, and statistical analysis course work, enabling students to analyze and understand geographic patterns of health. Students have opportunities to work on applied problems, such as assessing patterns of disease, identifying the underlying population and environmental drivers of good or poor health, and evaluating the social dimensions of environmental impacts.

In addition to satisfying the common requirements, students in the health and society track complete three common track courses (9 s.h.) and at least two upper-level geographical and sustainability sciences courses (6 s.h.).

**Common courses—all health and society track students take these:**

- **GEOG:2110** Seven Billion and Counting: Introduction to Population Dynamics 3
- **GEOG:3110** Geography of Health 3
- **GEOG:4150** Health and Environment: GIS Applications 3

Students choose two upper-level courses (at least 6 s.h.) from the following, in consultation with their advisor. Those who wish to gain additional experience in theory and application of

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**Course List**

- **GEOG:4520** GIS for Environmental Studies: Applications 3
- **GEOG:4570** Spatial Analysis and Location Models 3
- **GEOG:4770** Environmental Justice 3
- **CS:1210** Computer Science I: Fundamentals 4
- **CS:2110** Programming for Informatics 4
- **GEOG:3500** Introduction to Environmental Remote Sensing 3
- **GEOG:3520** GIS for Environmental Studies 3
- **GEOG:3540** Introduction to Geographic Visualization 3
- **GEOG:3560** Spatial Analyses of Wind Energy 3
- **GEOG:3760** Hazards and Society 3
- **GEOG:4010** Field Methods in Physical Geography 3
- **GEOG:4020** Field Methods: Mapping and Mobile Computing 3
- **GEOG:4150** Health and Environment: GIS Applications 3
- **GEOG:4580** Introduction to Geographic Databases 3
- **GEOG:3340** Ecosystem Services: Human Dependence on Natural Systems 3
- **GEOG:3560** Spatial Analyses of Wind Energy 3
- **GEOG:3760** Hazards and Society 3
- **GEOG:4010** Field Methods in Physical Geography 3
- **GEOG:4020** Field Methods: Mapping and Mobile Computing 3
- **GEOG:4150** Health and Environment: GIS Applications 3
- **GEOG:4770** Environmental Justice 3

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**Geography, B.S.**
GIS systems should also take an additional 6 s.h. in GIS-based geographical and sustainability sciences courses.

At least two of these:

- GEOG:3070/ GHS:3070 Hungry Planet: Global Geographies of Food 3
- GEOG:3760/ GHS:3760 Hazards and Society 3
- GEOG:3920/ URP:3001 Planning Livable Cities 3
- GEOG:4770 Environmental Justice 3

**B.S. with Teacher Licensure**

Majors interested in earning licensure to teach in elementary and/or secondary schools must complete the College of Education's Teacher Education Program (TEP) in addition to the requirements for the major and all requirements for graduation. The TEP requires several College of Education courses and student teaching. Contact the Office of Student Services for details.

Students must satisfy all degree requirements and complete Teacher Education Program licensure before degree conferral.

**Honors**

**Honors in the Major**

Students have the opportunity to graduate with honors in the major. Departmental honors students must maintain a cumulative University of Iowa g.p.a. of at least 3.33 and a major g.p.a. of at least 3.33 in all work for the major. They must be admitted to the department's honors program by the first semester of their senior year or earlier.

Honors students in geography pursue study beyond the typical undergraduate level. In order to graduate with honors in the major, they work under the direction of a faculty member to conduct original research and then prepare and present an honors thesis based on their research. The thesis is reviewed by a committee of at least three faculty members. Departmental honors students earn credit for their thesis by registering for GEOG:4995 Honors Thesis. They may substitute GEOG:4030 Senior Project Seminar for GEOG:4995, as long as they continue to work on the thesis under the direction of a faculty member.

**University of Iowa Honors Program**

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the University’s honors program.

Membership in the UI Honors Program is not required to earn honors in the geography major.

**Academic Plans**

**Four-Year Graduation Plan**

The following checkpoints list the minimum requirements students must complete by certain semesters in order to stay on the University's Four-Year Graduation Plan. Courses in the major are those required to complete the major; they may be offered by departments other than the major department.

**Before the third semester begins:** two introductory courses in the major

**Before the fifth semester begins:** six courses in the major

**Before the seventh semester begins:** 12 courses in the major and at least 90 s.h. earned toward the degree

**Before the eighth semester begins:** 15 courses in the major

**During the eighth semester:** enrollment in all remaining course work in the major, all remaining General Education courses, and a sufficient number of semester hours to graduate

**Sample Plans of Study**

**Geography (B.S.)**

**Environmental Studies Track**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG:1090</td>
<td>Globalization and Geographic Diversity (major, also GE: International and Global Issues)</td>
<td>3</td>
</tr>
<tr>
<td>RHET:1030</td>
<td>Rhetoric (GE: Rhetoric or other General Education course)</td>
<td>4</td>
</tr>
<tr>
<td>GE: Values and Culture</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE: World Languages or elective course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Spring**

| GEOG:1020      | The Global Environment (major)                           | 3     |
| GEOG:1021      | The Global Environment Lab (major, also GE: Natural Sciences with a lab) | 1     |
| ENGL:1200      | The Interpretation of Literature (GE: Interpretation of Literature ) | 3     |
| GE: Diversity and Inclusion                        | 3     |
| GE: Historical Perspectives                          | 3     |
| Elective course                                      | 2     |
|          | **Hours**                                                   | **15**|

**Second Year**

| GEOG:1070      | Contemporary Environmental Issues (major, also GE: Social Sciences) | 3     |
| MATH:1460      | Calculus for the Biological Sciences (GE: Quantitative or Formal Reasoning) | 4     |
| GE: World Languages or elective course              | 3-5   |
| Elective course                                      | 3     |
| Elective course                                      | 2     |
|          | **Hours**                                                   | **15-17**|

**Spring**

| GEOG:1050      | Foundations of GIS (major)                                 | 3     |
| Major: geography course                               | 3     |
| GE: Literary, Visual, and Performing Arts              | 3     |
| GE: World Languages or elective course                | 3-5   |
Elective course 3

Third Year
Fall
STAT:4143 Introduction to Statistical Methods (major) 3
Major: upper-level geography course 3
GE: Natural Sciences without a lab 3
GE: World Languages or elective course 3
Elective course 3

Spring
STAT:6513 Intermediate Statistical Methods (major) 4
Major: upper-level environmental studies track course 3
GE: World Languages or elective course 3
Elective course 2

Fourth Year
Fall
Major: upper-level environmental studies track course 3
Major: upper-level environmental studies track course 3
Elective course 3
Elective course 3

Spring
GEOG:4990 Senior Thesis (major) 3
Major: upper-level environmental studies track course 3
Elective course 3
Elective course 3

Elective course 3

Total Hours 120-128

1 General Education (GE) courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses. For more information, view the General Education Program.
2 Students may use their elective courses to complete a double major, minors, or certificates.
3 Students who have completed four years of a single language in high school have satisfied the College of Liberal Arts and Sciences GE: World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

Geographic Information Sciences Track

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Spring
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GEOG:1021 | The Global Environment Lab (major, also GE: Natural Sciences with a lab) | 1 |
ENGL:1200 | The Interpretation of Literature (GE: Interpretation of Literature) | 3 |
GE: World Languages or elective course | 3-5 |
Elective course | 3 |
Elective course | 2 |

Second Year
Fall
GEOG:1050 | Foundations of GIS (major) | 3 |
MATH:1460 | Calculus for the Biological Sciences (major, also GE: Quantitative or Formal Reasoning) | 4 |
GE: World Languages or elective course | 3-5 |
Elective course | 3 |
Elective course | 2 |

Spring
GEOG:1070 | Contemporary Environmental Issues (major, also GE: Social Sciences) | 3 |
CS:1110 | Introduction to Computer Science (major) | 3 |
GE: Historical Perspectives | 3 |
GE: World Languages or elective course | 3-5 |
Elective course | 3 |

Third Year
Fall
STAT:4143 | Introduction to Statistical Methods (major) | 3 |
Major: upper-level GIS track course | 3 |
GE: Literary, Visual, and Performing Arts | 3 |
Elective course | 3 |
Elective course | 3 |

Spring
GEOG:3992 | Undergraduate Research (major) | 1 |
STAT:6513 | Intermediate Statistical Methods (major) | 4 |
Major: upper-level GIS track course | 3 |
GE: Natural Sciences without a lab 3
Elective course 3
Elective course 1

| Hours | 15 |

**Fourth Year**

**Fall**

| Major: upper-level GIS track course | 3 |
| Major: upper-level GIS track course | 3 |
| GE: Values and Culture | 3 |
| Elective course | 3 |
| Elective course | 3 |

| Hours | 15 |

**Spring**

| GEOG:4030 Senior Project Seminar (major) | 3 |
| Major: upper-level GIS track course | 3 |
| Elective course | 3 |
| Elective course | 3 |
| Elective course | 3 |

| Hours | 15 |

| Total Hours | 120-128 |

1. General Education (GE) courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses. For more information, view the General Education Program.

2. Students who have completed four years of a single language in high school have satisfied the College of Liberal Arts and Sciences GE: World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.

3. Students may use their elective courses to complete a double major, minors, or certificates.

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### Career Advancement

Geography majors are encouraged to participate in an internship. The department maintains close ties with the Iowa Department of Natural Resources and other local agencies that offer internships.

Courses in geography are commonly required of students preparing to teach at the elementary and secondary school levels or to work in urban and regional planning. The degree also provides a solid background for many related professions, including law, health care, environmental engineering, and business.

The application of geographic information systems (GIS) to social, economic, and environmental problems has increased considerably during the past decade. This trend is likely to continue into the future; in fact, the U.S. Department of Labor has identified the area as one of its 14 high-growth industries. GIS presents an abundance of career opportunities for geography graduates in local, state, and federal government agencies, as well as in the private sector.

The department’s faculty members help students apply for postgraduate programs and contact potential employers.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.