Cartography and GIS, also known more broadly as geographic information science, studies and develops digital technology and the theory behind it to help people work with geographic information. This broad area interfaces with work from the physical and social sciences. It is a field devoted to the acquisition, management, analysis, visualization, and representation of geospatial data. It is a relatively new discipline that incorporates geography, cartography, spatial analysis, and related fields such as geovisualization, geodesy, geocomputation, cognition, and computer science. At the present time professionals trained in geographic information science are very much in demand by federal agencies, state and local governments, and private firms.

**HOW TO GET IN**

Exploring the field of geographic information science at UW–Madison is easy. Interested students are strongly encouraged to take introductory courses in the field. The Department of Geography offers four introductory courses in geographic information science:

- GEOG 170 Our Digital Globe: An Overview of GIScience and its Technology (online);
- GEOG 370 Introduction to Cartography;
- GEOG/ENVIR ST/F&W ECOL/G L E/GEOSCI/LAND ARC 371 Introduction to Environmental Remote Sensing; and
- GEOG/CIV ENGR/ENVIR ST 377 An Introduction to Geographic Information Systems

Students who intend to declare their major as cartography and GIS need to schedule an appointment with the geography undergraduate advisor, Joel Gruley, at jgruley@wisc.edu.

**REQUIREMENTS**

**UNIVERSITY GENERAL EDUCATION REQUIREMENTS**

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatetext) section of the Guide.

**COLLEGE OF LETTERS & SCIENCE BREADTH AND DEGREE REQUIREMENTS: BACHELOR OF ARTS (B.A.)**

Students pursuing a bachelor of arts degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either a bachelor of arts or a bachelor of science curriculum. View a comparison of the degree requirements here. (https://pubs.wisc.edu/home/archives/ug15/images/babs2009.pdf)

**BACHELOR OF ARTS DEGREE REQUIREMENTS**

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>Fulfilled with completion of University General Education requirements Quantitative Reasoning a (QR A) and Quantitative Reasoning b (QR B) coursework. Please note that some majors may require students to complete additional math coursework beyond the B.A. mathematics requirement.</td>
</tr>
</tbody>
</table>
| Foreign Language | • Complete the fourth unit of a foreign language; OR  
• Complete the third unit of a foreign language and the second unit of an additional foreign language  
Note: A unit is one year of high school work or one semester/term of college work. |
| L&S Breadth   | • Humanities, 12 credits: 6 of the 12 credits must be in literature  
• Social Sciences, 12 credits  
• Natural Sciences, 12 credits: must include one 3+ credit course in the biological sciences; must include one 3+ credit course in the physical sciences |

**Liberal Arts and Science Coursework**  
108 credits

**Depth of Intermediate/Advanced work**  
60 intermediate or advanced credits

**Major**  
Declare and complete at least one (1) major

**Total Credits**  
120 credits

**UW-Madison Experience**  
30 credits in residence, overall

**Experience**  
30 credits in residence after the 90th credit
Minimum 2.000 in all coursework at UW–Madison
GPAs 2.000 in intermediate/advanced coursework at UW–Madison

NON–L&S STUDENTS PURSUING AN L&S MAJOR
Non–L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements and do not need to complete the L&S breadth and degree requirements above.

REQUIREMENTS FOR THE MAJOR
30 CREDITS IN GEOGRAPHY

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 360</td>
<td>Quantitative Methods in Geographical Analysis (offered only in spring)</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 301</td>
<td>Introduction to Statistical Methods</td>
<td></td>
</tr>
<tr>
<td>or STAT 371</td>
<td>Introductory Applied Statistics for the Life Sciences</td>
<td></td>
</tr>
<tr>
<td>GEOG 370</td>
<td>Introduction to Cartography</td>
<td></td>
</tr>
<tr>
<td>GEOG/CIV ENGR/ENVIR ST 377</td>
<td>An Introduction to Geographic Information Systems</td>
<td></td>
</tr>
<tr>
<td>GEOG 565</td>
<td>Colloquium for Undergraduate Majors (offered only in fall)</td>
<td></td>
</tr>
</tbody>
</table>

Electives—three courses from:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 572</td>
<td>Graphic Design in Cartography</td>
<td></td>
</tr>
<tr>
<td>GEOG 575</td>
<td>Interactive Cartography &amp; Geovisualization</td>
<td></td>
</tr>
<tr>
<td>GEOG 576</td>
<td>Geospatial Web and Mobile Programming</td>
<td></td>
</tr>
<tr>
<td>GEOG 578</td>
<td>GIS Applications</td>
<td></td>
</tr>
<tr>
<td>GEOG 579</td>
<td>GIS and Spatial Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Topical Breadth—one course from each area: 1

**Physical Geography**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG/ENVIR ST 120</td>
<td>Introduction to the Earth System</td>
<td>3</td>
</tr>
</tbody>
</table>

**Human Geography or Area Studies and Global Systems**

**College-level mathematics**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG/ENVIR ST F&amp;W ECOL/GEOSCI/LAND ARC 371</td>
<td>Introduction to Environmental Remote Sensing</td>
<td>8</td>
</tr>
<tr>
<td>GEOG 378</td>
<td>Introduction to Geocomputing</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 30

1 Course is listed in more than one subarea. Students must choose the subarea in which they want to count the course.

TOPICAL BREADTH AREAS

**Physical Geography**

The locational arrangements of earth phenomena and their interaction as physical systems:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG/ENVIR ST 127</td>
<td>Physical Systems of the Environment</td>
<td>5</td>
</tr>
<tr>
<td>GEOG/GEOSCI 320</td>
<td>Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/ATM OCN 323</td>
<td>Science of Climate Change</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/ENVIR ST 325</td>
<td>Analysis of the Physical Environment</td>
<td>4</td>
</tr>
<tr>
<td>GEOG/GEOSCI 326</td>
<td>Landforms-Topics and Regions</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 329</td>
<td>Landforms and Landscapes of North America</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/ATM OCN/ENVIR ST/GEOSCI 335</td>
<td>Climatic Environments of the Past</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/GEOSCI 332</td>
<td>The Quaternary Period</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Course is listed in more than one subarea. Students must choose the subarea in which they want to count the course.

**People–Environment Geography**

The human use, perception, and modification of environments:

<table>
<thead>
<tr>
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<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>GEOG/ENVIR ST 139</td>
<td>Living in the Global Environment: An Introduction to People-Environment Geography</td>
<td>3-4</td>
</tr>
<tr>
<td>GEOG/ENVIR ST/SOIL SCI 230</td>
<td>Soil: Ecosystem and Resource</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/ENVIR ST 309</td>
<td>People, Land and Food: Comparative Study of Agriculture Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/ATM OCN/ENVIR ST 332</td>
<td>Global Warming: Science and Impacts 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/ENVIR ST 337</td>
<td>Nature, Power and Society</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/BOTANY 338</td>
<td>Environmental Biogeography 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 344</td>
<td>The American West 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/GEOSCI 420</td>
<td>Glacial and Pleistocene Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/GEOSCI 523</td>
<td>Quaternary Vegetation Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/SOIL SCI 525</td>
<td>Soil Geomorphology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/SOIL SCI 526</td>
<td>Human Transformations of Earth Surface Processes 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/GEOSCI 527</td>
<td>The Quaternary Period</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Course is listed in more than one subarea. Students must choose the subarea in which they want to count the course.

**Topical Breadth Areas**

**Physical Geography**

The locational arrangements of earth phenomena and their interaction as physical systems:

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<td>Introduction to the Earth System</td>
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**Human Geography or Area Studies and Global Systems**

**College-level mathematics**

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</thead>
<tbody>
<tr>
<td>GEOG/ENVIR ST F&amp;W ECOL/GEOSCI/LAND ARC 371</td>
<td>Introduction to Environmental Remote Sensing</td>
<td>8</td>
</tr>
<tr>
<td>GEOG 378</td>
<td>Introduction to Geocomputing</td>
<td></td>
</tr>
</tbody>
</table>
GEOG/ENVIR ST 537 Culture and Environment 4
GEOG 538 The Humid Tropics: Ecology, Subsistence, and Development 4
GEOG/ENVIR ST 557 Development and Environment in Southeast Asia 1 3

1 Course is listed in more than one subarea. Students must choose the subarea in which they want to count the course.

Human Geography
The location and organization of human settlements and activities:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 101</td>
<td>Introduction to Human Geography</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 301</td>
<td>Geography of Social Organization</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/URB R PL 305</td>
<td>Introduction to the City</td>
<td>3-4</td>
</tr>
<tr>
<td>GEOG 318</td>
<td>Introduction to Geopolitics</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 340</td>
<td>World Regions in Global Context 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 348</td>
<td>Latin America 1</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 349</td>
<td>Europe 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 355</td>
<td>Africa, South of the Sahara 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 358</td>
<td>Human Geography of Southeast Asia 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOG/ENVIR ST/HISTORY 469</td>
<td>The Making of the American Landscape 1</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 501</td>
<td>Space and Place: A Geography of Experience</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 510</td>
<td>Economic Geography</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 518</td>
<td>Power, Place, Identity</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 566</td>
<td>History of Geographic Thought</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Course is listed in more than one subarea. Students must choose the subarea in which they want to count the course.

Area Studies and Global Systems
The ways in which regions, places, and landscapes have acquired distinctive characteristics and problems as a result of their locations and resource potentials and of their settlement, appraisal, and use by particular peoples and cultures:

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>GEOG/HISTORY/LCA/POLI SCI/SOC 244</td>
<td>Introduction to Southeast Asia: Vietnam to the Philippines</td>
<td>4</td>
</tr>
<tr>
<td>GEOG/HISTORY/LCA/POLI SCI/SOC 252</td>
<td>The Civilizations of India-Modern Period</td>
<td>4</td>
</tr>
<tr>
<td>GEOG/HISTORY/POLI SCI/SLAVIC 253</td>
<td>Russia: An Interdisciplinary Survey</td>
<td>4</td>
</tr>
<tr>
<td>GEOG/HISTORY/POLI SCI/SLAVIC 254</td>
<td>Eastern Europe: An Interdisciplinary Survey</td>
<td>4</td>
</tr>
<tr>
<td>GEOG/AFROAMER/ANTHRO/C&amp;E SOC/HISTORY/LACIS/POLI SCI/SOC/SPANISH 260</td>
<td>Latin America: An Introduction 3-4</td>
<td></td>
</tr>
</tbody>
</table>

1 Course is listed in more than one subarea. Students must choose the subarea in which they want to count the course.

RESIDENCE AND QUALITY OF WORK
2.000 GPA in all GEOG and major courses
2.000 GPA on 15 upper-level major credits, taken in residence 1
15 credits in GEOG, taken on the UW–Madison campus 2

HONORS IN THE MAJOR
Students may declare Honors in the Cartography and Geographic Information Systems Major in consultation with the Cartography and Geographic Information Systems undergraduate advisor.

HONORS IN THE CARTOGRAPHY AND GEOGRAPHIC INFORMATION SYSTEMS MAJOR REQUIREMENTS
To earn a B.A. or B.S. with Honors in the Major in Cartography and Geographic Information Systems students must satisfy both the requirements for the major (above) and the following additional requirements:

- Earn a 3.300 overall university GPA
- Earn a 3.300 GPA for all GEOG courses, and all courses accepted in the major
- Complete a two-semester Senior Honors Thesis in GEOG 681 Senior Honors Thesis and GEOG 682 Senior Honors Thesis, for a total of 6 credits.

UNIVERSITY DEGREE REQUIREMENTS
Total Degree
To receive a bachelor’s degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency

Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.

Quality of Work

Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

ADVISING AND CAREERS

ADVISING

Students with questions about the major, courses, and careers are encouraged to contact the geography undergraduate advisor, Joel Gruley, at jgruley@wisc.edu.

CAREERS

Cartography and GIS, and geography more broadly, are remarkably interdisciplinary fields that span the natural sciences, social sciences, and humanities. The types of careers that cartography and GIS can prepare students for thus reflect this diversity. Geographic information scientists work across the public, private, and nonprofit sectors, and commonly work in the following fields, where they acquire, manage, analyze, visualize, and represent geospatial data: environmental policy, conservation, and management; digital cartography; urban and transportation planning; economic and community development; geospatial intelligence; food security; historic preservation; environmental hazards management; demography and human health; human migration and displacement; journalism; international conflict resolution; tourism.

PEOPLE

Professors Burt, Cadwallader, Cronon, Downey, Kaiser, Knox, Mason, Naughton, Olds, Ostergren, Turner, Williams, Zhu

Associate Professors Alatout, Dennis

Assistant Professors Baird, Gibbs, Marin-Spiotta, Ozdogan, Robertson, Roth, Schneider, Woodward, Young