GEOGRAPHY, BS

Banner Code: SC-BS-GEOG

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The Geography, BS is designed to offer students the opportunity to study the integrated social and environmental processes that continuously shape and reshape the world we live in. This major provides students with broad training across the core subdisciplines of geography (human, physical, and GIScience), emphasizing application and technique-driven coursework, in addition to a rigorous science and mathematics curriculum. Students will find numerous opportunities for employment in both the private and public sectors, as well as in academia. Given their interdisciplinary approach and uniquely spatial perspective, geographers are well suited to address important local, regional, and global challenges in today’s world.

The Department of Geography and Geoinformation Science (http://catalog.gmu.edu/colleges-schools/science/geography-geoinformation-science/) fosters a supportive, active learning environment in which students are encouraged to work closely with both faculty and peers. The curriculum in this major provides students with the analytical, technical, and practical training that prepares them to be successful in an ever-evolving job market. For students who wish to pursue their interest in geography via a more flexible degree program, the department also offers a Geography, BA (http://catalog.gmu.edu/colleges-schools/science/geography-geoinformation-science/geography-ba/).

Admissions & Policies

Admissions

University-wide admissions policies can be found in the Undergraduate Admissions Policies (http://catalog.gmu.edu/admissions/undergraduate-policies/) section of this catalog.

To apply for this program, please complete the George Mason University Admissions Application (https://www2.gmu.edu/admissions-aid/apply-now/).

Policies

Students must fulfill all Requirements for Bachelor’s Degrees (http://catalog.gmu.edu/policies/academic/undergraduate-policies/#text) including the Mason Core (http://catalog.gmu.edu/mason-core/).

GGS 415 Seminar in Geographic Thought and Methodology fulfills the writing intensive requirement.

For policies governing all undergraduate programs, see AP.5 Undergraduate Policies (http://catalog.gmu.edu/policies/academic/undergraduate-policies/).

Requirements

Degree Requirements

Total credits: minimum 120

Students should refer to the Admissions & Policies tab for specific policies related to this program.

Geography

Candidates for the Geography, BS degree must complete the following Core, Breadth and Experience, and Spatial Computing courses with a minimum GPA of 2.00.

Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GGS 102</td>
<td>Physical Geography (Mason Core) (<a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a>)</td>
<td>3-4</td>
</tr>
<tr>
<td>or GGS 121</td>
<td>Dynamic Atmosphere and Hydrosphere (Mason Core) (<a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a>)</td>
<td></td>
</tr>
<tr>
<td>or GGS 122</td>
<td>Dynamic Geosphere and Ecosphere</td>
<td></td>
</tr>
<tr>
<td>GGS 103</td>
<td>Human Geography (Mason Core) (<a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a>)</td>
<td>3</td>
</tr>
<tr>
<td>GGS 110</td>
<td>Introduction to Geoinformation Technologies</td>
<td>3</td>
</tr>
<tr>
<td>GGS 300</td>
<td>Quantitative Methods for Geographical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GGS 310</td>
<td>Cartographic Design</td>
<td>3</td>
</tr>
<tr>
<td>GGS 311</td>
<td>Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>GGS 415</td>
<td>Seminar in Geographic Thought and Methodology ¹</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 21-22

¹ Fulfills the writing intensive requirement.

Breadth and Experience Courses

Systematic Courses

Select one from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GGS 301</td>
<td>Political Geography (Mason Core) (<a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a>)</td>
<td>3</td>
</tr>
<tr>
<td>GGS 302</td>
<td>Global Environmental Hazards</td>
<td></td>
</tr>
<tr>
<td>GGS 303</td>
<td>Geography of Resource Conservation (Mason Core) (<a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a>)</td>
<td></td>
</tr>
<tr>
<td>GGS 304</td>
<td>Population Geography (Mason Core) (<a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a>)</td>
<td></td>
</tr>
<tr>
<td>GGS 305</td>
<td>Economic Geography</td>
<td></td>
</tr>
<tr>
<td>GGS 306</td>
<td>Urban Geography</td>
<td></td>
</tr>
<tr>
<td>GGS 307</td>
<td>Geographic Approaches for Sustainable Development</td>
<td></td>
</tr>
<tr>
<td>GGS 309</td>
<td>Introduction to Weather and Climate</td>
<td></td>
</tr>
<tr>
<td>GGS 312</td>
<td>Physical Climatology</td>
<td></td>
</tr>
<tr>
<td>GGS 314</td>
<td>Severe and Extreme Weather</td>
<td></td>
</tr>
</tbody>
</table>
GGS 321  Biogeography  
GGS 340  Health Geography  
GGS 344  Military Geography  
GGS 357  Urban Planning  

**Regional Courses**

Select one from the following:  

- GGS 315  Geography of the United States  
- GGS 316  Geography of Latin America  
- GGS 317  Geography of China (Mason Core) ([http://catalog.gmu.edu/mason-core/](http://catalog.gmu.edu/mason-core/))  
- GGS 320  Geography of Europe  
- GGS 325  Geography of North Africa and the Middle East  
- GGS 326  Geography of Eastern Europe and Russia  
- GGS 333  Issues in Regional Geography  
- GGS 380  Geography of Virginia  

**Electives**

Select 3 credits of GGS courses  
Select 6 credits of upper division GGS courses  

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>GGS 366</td>
<td>Spatial Computing</td>
<td>3</td>
</tr>
<tr>
<td>or CDS 130</td>
<td>Computing for Scientists (Mason Core)</td>
<td></td>
</tr>
<tr>
<td>MATH 113</td>
<td>Analytic Geometry and Calculus I (Mason Core) (<a href="http://catalog.gmu.edu/mason-core/">http://catalog.gmu.edu/mason-core/</a>)</td>
<td>4</td>
</tr>
<tr>
<td>GGS 379</td>
<td>Remote Sensing</td>
<td>3</td>
</tr>
</tbody>
</table>

Select four courses from the following:  

- GGS 308  Field Mapping Techniques  
- GGS 354  Data Analysis and Global Change Detection Techniques  
- GGS 366  Spatial Computing  
- GGS 411  Geovisualization  
- GGS 412  Air Photography Interpretation  
- GGS 416  Satellite Image Analysis  
- GGS 422  Drone Remote Sensing  
- GGS 426  Physical Fundamentals of Remote Sensing  
- GGS 429  Remote Sensing of the Environment and Earth System  
- GGS 462  Web-based Geographic Information Systems  
- GGS 463  RS: GIS Analysis and Application  
- GGS 470  Special Topics in Geographic Techniques  

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<tr>
<td></td>
<td>Synthesis/Capstone (<a href="http://catalog.gmu.edu/mason-core/#synthesis-capstone">http://catalog.gmu.edu/mason-core/#synthesis-capstone</a>)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Mason Core and Elective Credits**

In order to meet a minimum of 120 credits, this degree requires an additional 61-62 credits, which may be applied toward any remaining Mason Core ([http://catalog.gmu.edu/mason-core/](http://catalog.gmu.edu/mason-core/)) requirements, Requirements for Bachelor's Degrees ([http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2](http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2)), Alternative to a Concentration, and elective courses. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

### Mason Core

Some Mason Core ([http://catalog.gmu.edu/mason-core/](http://catalog.gmu.edu/mason-core/)) requirements may already be fulfilled by the major requirements listed above. Students are strongly encouraged to consult their advisors to ensure they fulfill all remaining Mason Core ([http://catalog.gmu.edu/mason-core/](http://catalog.gmu.edu/mason-core/)) requirements.

#### Code  Title  Credits

- **Foundation Requirements**
  - Written Communication (ENGH 101) ([http://catalog.gmu.edu/mason-core/#written](http://catalog.gmu.edu/mason-core/#written))  
  - Oral Communication ([http://catalog.gmu.edu/mason-core/#oral](http://catalog.gmu.edu/mason-core/#oral))  
  - Quantitative Reasoning ([http://catalog.gmu.edu/mason-core/#quantitative](http://catalog.gmu.edu/mason-core/#quantitative))  
  - Information Technology and Computing ([http://catalog.gmu.edu/mason-core/#information-technology](http://catalog.gmu.edu/mason-core/#information-technology))

#### Exploration Requirements

- Arts ([http://catalog.gmu.edu/mason-core/#arts](http://catalog.gmu.edu/mason-core/#arts))  
- Global Understanding ([http://catalog.gmu.edu/mason-core/#global](http://catalog.gmu.edu/mason-core/#global))  
- Literature ([http://catalog.gmu.edu/mason-core/#literature](http://catalog.gmu.edu/mason-core/#literature))  
- Natural Science ([http://catalog.gmu.edu/mason-core/#natural-science](http://catalog.gmu.edu/mason-core/#natural-science))  
- Social and Behavioral Sciences ([http://catalog.gmu.edu/mason-core/#social-behavioral-science](http://catalog.gmu.edu/mason-core/#social-behavioral-science))  

#### Integration Requirements

- Written Communications (ENGH 302) ([http://catalog.gmu.edu/mason-core/#written](http://catalog.gmu.edu/mason-core/#written))  
- Writing-Intensive ([http://catalog.gmu.edu/mason-core/#wi](http://catalog.gmu.edu/mason-core/#wi))  

<table>
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</thead>
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<tr>
<td></td>
<td>Synthesis/Capstone (<a href="http://catalog.gmu.edu/mason-core/#synthesis-capstone">http://catalog.gmu.edu/mason-core/#synthesis-capstone</a>)</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Total Credits  40

1. Most programs include the writing-intensive course designated for the major as part of the major requirements; this course is therefore not counted towards the total required for Mason Core.
2. Minimum 3 credits required.

### Honors

**Honors in the Major**

To graduate with departmental honors in Geography, students must have a minimum GPA of 3.50 in GGS courses, an overall GPA of 3.50, and complete the following courses each with a grade of 'B+' or above:

#### Code  Title  Credits

- GGS 463  RS: GIS Analysis and Application  
- GGS 499  GGS Independent Study  
- 3 credits of 500-699 level GGS courses ([http://catalog.gmu.edu/courses/ggs/](http://catalog.gmu.edu/courses/ggs/))
Before registering for this course, students must have identified a topic under the guidance of a full-time faculty member following departmental guidelines.

Eligibility for these courses is restricted to students who obtain permission from the undergraduate coordinator or those in the Accelerated Master’s program.

### Accelerated Master's

#### Bachelor's Degree (any)/Geographic and Cartographic Sciences, Accelerated MS

**Overview**

Offered by the Department of Geography and Geoinformation Sciences (GGS) in the College of Science, this bachelor’s/accelerated master’s degree program enables highly qualified undergraduates to obtain any Mason bachelor’s degree and the Geographic and Cartographic Sciences, MS degrees within an accelerated timeframe. The program strategy enables students to undertake graduate coursework during their final year in the bachelor’s degree. In the case of a 120 credit bachelor’s program, this accelerated master’s option can be completed as a 138 credit program (thesis option) or 145 credit program (comprehensive exam option). This accelerated pathway prepares students for professional careers where geoinformation management, geographic analysis, and geospatial visualization are of importance.

Students in this accelerated degree program must fulfill all university requirements for the bachelor’s program and the Geographic and Cartographic Sciences, MS. While the information below is largely comprehensive, students are strongly encouraged to also review AP.6.7 Bachelor’s/Accelerated Master’s Degrees.

**Application Requirements**

Students with an overall GPA of at least 3.0 may apply for provisional acceptance into this accelerated master’s program after completing at least 60 undergraduate credits. Additionally, students must have completed the following courses with a combined GPA of 3.0 or better: GGS 300 Quantitative Methods for Geographical Analysis, GGS 311 Geographic Information Systems, and any one upper level GGS-prefixed course.

Applicants to all graduate programs at Mason must meet the admission standards and application requirements for graduate study as specified in the Admissions section of this catalog. However, this accelerated master’s does not require GRE test scores, letters of recommendation, CV/resume, or a statement of interest.

While being undergraduate students, accelerated master’s students must complete the graduate courses indicated on their Accelerated Master’s Program Application with a minimum grade of B in each course. They must maintain a minimum GPA of 3.0 in all coursework and in coursework applied to their major.

At the beginning of their final undergraduate semester, they must submit the Bachelor’s/Accelerated Master’s Transition Form (found on the Office of the University Registrar website). Students must begin their master’s program in the semester immediately following the term of undergraduate degree conferral. Students should consult with their faculty advisor in the Department of Geography and Geoinformation Science and the Office of Academic and Student Affairs to obtain further guidance.

**Accelerated Option Requirements**

Students admitted to this program may start taking graduate courses after completing 75 undergraduate credits. It is recommended that students register for one of the following courses in their first semester of accelerated coursework:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>GGS 551</td>
<td>Cartographic Design</td>
<td>3</td>
</tr>
<tr>
<td>GGS 553</td>
<td>Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>GGS 560</td>
<td>Quantitative Methods</td>
<td>3</td>
</tr>
<tr>
<td>GGS 579</td>
<td>Remote Sensing</td>
<td>3</td>
</tr>
</tbody>
</table>

Including the course chosen above, up to 12 credits of graduate coursework may be applied to both undergraduate degree and the master’s degree. If students earn at least a B in these classes, they are granted advanced standing in the master’s program and must then complete 18 (thesis option) or 25 (comprehensive exam option) additional credits to receive the master’s degree. All other master’s degree requirements must be met.

**Reserve Graduate Credit**

During the bachelor’s degree status, students may take up to 6 graduate credits as reserve graduate credit. These credits do not apply to the undergraduate degree, but will reduce the subsequent master’s degree credits accordingly. With 12 credits counted toward the undergraduate and graduate degrees plus the maximum 6 reserve credits, the credits necessary for the graduate degree can be reduced by up to 18. The ability to take courses for reserve graduate credit is available to all high achieving undergraduates with the permission of the department. To apply the reserved credits to the master’s degree, students must request their transfer from the undergraduate degree to the graduate degree via the Bachelor’s/ Accelerated Master’s Transition Form found on the Office of the University Registrar website.

### Bachelor's Degree (any)/Geoinformatics and Geospatial Intelligence, Accelerated MS

**Overview**

Offered by the Department of Geography and Geoinformation Sciences (GGS) in the College of Science, this bachelor’s/accelerated master’s degree program enables highly qualified undergraduates to obtain any Mason bachelor’s degree and the Geoinformatics and Geospatial Intelligence, MS degrees within an accelerated timeframe. The program strategy enables students to undertake graduate coursework during their final year in the bachelor’s degree. In the case of a 120 credit bachelor’s program, this accelerated master’s option can be completed
as a 141 credit program. This accelerated pathway prepares students for professional careers where geoinformation management, geographic analysis, and geointelligence and geovisualization are of importance.

Students in this accelerated degree program must fulfill all university requirements for the bachelor's program and the Geoinformatics and Geospatial Intelligence, MS (http://catalog.gmu.edu/colleges-schools/science/geography-geoinformation-science/geoinformatics-geospatial-intelligence-ms/). While the information below is largely comprehensive, students are strongly encouraged to also review AP.6.7 Bachelor's/Accelerated Master's Degrees (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7).

**Application Requirements**

Students with an overall GPA of at least 3.0 may apply for provisional acceptance into this accelerated master's program after completing at least 60 undergraduate credits. Additionally, students must have completed the following courses with a combined GPA of 3.0 or better: GGS 300 Quantitative Methods for Geographical Analysis, GGS 311 Geographic Information Systems, and any one upper level GGS-prefixed course.

Applicants to all graduate programs at Mason must meet the admission standards and application requirements for graduate study as specified in the Admissions section of this catalog. However, this accelerated master’s does not require GRE test scores, letters of recommendation, CV/resume, or a statement of interest.

While being undergraduate students, accelerated master’s students must complete the graduate courses indicated on their Accelerated Master’s Program Application (obtained from the Office of Academic and Student Affairs) with a minimum grade of B in each course. They must maintain a minimum GPA of 3.0 in all coursework and in coursework applied to their major.

At the beginning of their final undergraduate semester, they must submit the Bachelor's/Accelerated Master's Transition Form (found on the Office of the University Registrar website). Students must begin their master's program in the semester immediately following the term of undergraduate degree conferral. Students should consult with their faculty advisor in the Department of Geography and Geoinformation Science and the Office of Academic and Student Affairs to obtain further guidance.

**Accelerated Option Requirements**

Students admitted to this program may start taking graduate courses after completing 75 undergraduate credits. It is recommended that students register for one of the following courses in their first semester of accelerated coursework:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GGS 550</td>
<td>Geospatial Science Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>GGS 553</td>
<td>Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>GGS 579</td>
<td>Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>GGS 684</td>
<td>Selected Topics in Geospatial Intelligence</td>
<td>3</td>
</tr>
</tbody>
</table>

Including the course chosen above, up to 12 credits of graduate coursework may be applied to both undergraduate degree and the master's degree. If students earn at least a B in these classes, they are granted advanced standing in the master’s program and must then complete 21 additional credits to receive the master's degree. All other master's degree requirements must be met.

**Reserve Graduate Credit**

During the bachelor's degree status, students may take up to 6 graduate credits as reserve graduate credit. These credits do not apply to the undergraduate degree, but will reduce the subsequent master's degree credits accordingly. With 12 credits counted toward the undergraduate and graduate degrees plus the maximum 6 reserve credits, the credits necessary for the graduate degree can be reduced by up to 18. The ability to take courses for reserve graduate credit is available to all high achieving undergraduates with the permission of the department. To apply the reserved credits to the master's degree, students must request their transfer from the undergraduate degree to the graduate degree via the Bachelor’s/Accelerated Master’s Transition Form found on the Office of the University Registrar website.