**GIS/Planning Option**

The GIS (Geographic Information Science)/Planning Option in the Department of Earth Sciences is designed to offer students a mix of technical skills and academic training that prepares them for careers in local, state, and federal planning as well as opportunities in private consulting firms that are involved in the planning process. The GIS/Planning Option recognizes the growing importance of Geographic Information Systems and Science in our society and how these analytic tools are applied in a wide variety of settings. The GIS/Planning Option takes advantage of excellent GIS facilities, lab space, expertise, and software available on campus and allows students to learn in an active hands-on environment. Students are prepared as map makers (cartographers) spatial analysts, and planners. The Department of Earth Sciences has connections with various local, state, and federal planning agencies within Montana and throughout the West. As part of their training, students may also be able to take advantage of internship opportunities as a way to further prepare for a wide variety of professional careers within the fields of planning and resource management. The optimal degree for employment and advancement in the in GIS/Planning area is the Master's Degree, and this undergraduate option is an excellent preparatory degree for graduate study. Some students interested in college teaching or advanced research may require a Ph.D. degree.

At the Freshman and Sophomore level, students take introductory courses in physical and human geography, GIS and cartography, statistics, intermediate technical writing, and computer aided design (CAD). In addition, courses in economics and political science lay the foundation for understanding the broader context of the planning process. As juniors and seniors, students complete an advanced 2-course sequence in GIS/Spatial Analysis (GPHY 384/GPHY 484R) and take skills-related coursework in Remote Sensing and in GPS technologies. Focused electives include courses in geographical planning, urban and economic geography, tourism and recreational planning, and in the politics of development. Students also complete basic coursework in soils, geomorphology and weather and climate because these variables are critical in the planning process. Additional electives are available in advanced classes in geography, earth science, ecology, natural resources, water resources, and statistics to allow students to specialize in areas of particular interest and develop their own emphases in subjects related to the geospatial sciences and the planning process. All students take the GIS Capstone course (GPHY 484R) which emphasizes independent study in the geospatial sciences through a semester project.

**Courses Required in Department**

**Freshman Year**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERTH 101IN</td>
<td>Earth System Sciences</td>
<td>4</td>
</tr>
<tr>
<td>ERTH 102CS</td>
<td>Topics in Earth Sciences</td>
<td>1</td>
</tr>
<tr>
<td>GPHY 121D</td>
<td>Human Geography</td>
<td>3</td>
</tr>
<tr>
<td>GPHY 141D</td>
<td>Geography of World Regions</td>
<td>3</td>
</tr>
<tr>
<td>ECNS 101IS</td>
<td>Economic Way of Thinking</td>
<td>3</td>
</tr>
<tr>
<td>MART 145RA</td>
<td>Web Design</td>
<td>3</td>
</tr>
<tr>
<td>M 151Q</td>
<td>Precalculus</td>
<td>4</td>
</tr>
<tr>
<td>WRIT 101W</td>
<td>College Writing I</td>
<td>3</td>
</tr>
<tr>
<td>University Core, Prerequisites and Electives</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td><strong>Year Total:</strong></td>
<td></td>
<td><strong>31</strong></td>
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**Sophomore Year**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>GPHY 284</td>
<td>Intro to GIS Science &amp; Cartog</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 245IN</td>
<td>Soils</td>
<td>3</td>
</tr>
<tr>
<td>PSCI 210IS</td>
<td>Introduction to American Government</td>
<td>3</td>
</tr>
</tbody>
</table>

**University Core, Prerequisites and Electives**

- CSCI 111 - Programming with Java I 4
- Take EITHER:
  - STAT 216Q - Introduction to Statistics
  - STAT 217Q - Intermediate Statistical Concepts
- OR
  - STAT 332 - Statistics for Scientists and Engineers
- Take ONE of the following:
  - WRIT 201 - College Writing II
  - WRIT 221 - Intermediate Tech Writing
- Take ONE of the following:
  - DDSN 114 - Introduction to CAD
  - SRVY 230 - Intro to Surveying for Engineers
- **Year Total:** 30

**Junior Year**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPHY 484R</td>
<td>Advanced GIS &amp; Spatial Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Take SIX of the following:

- GPHY 321 - Urban Geography 3
- GPHY 322 - Economic Geography 3
- GPHY 325 - Cultural Geography 3
- GPHY 326 - Geography of Energy Resources 3
- GPHY 329 - Environment and Society 3
- GPHY 445 - Adv. Regional Geography 3
- PSCT 423 - Politics of Development 3

**University Core, Prerequisites and Electives**

- **Year Total:** 30

**Senior Year**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPHY 484R</td>
<td>Applied GIS &amp; Spatial Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Take SIX of the following:

- BIOE 370 - General Ecology (equiv to 270) 3
- BIOE 375 - Ecological Responses to Climate Change 3
- BIOE 416 - Alpine Ecology 3
- NRSM 421 - Holistic Thought/Mgmt 3
- NRSM 430 - Natural Resource Law 3
- NRSM 453 - Habitat Inventory and Analysis 3
- NRSM 455 - Riparian Ecology & Management 3
- GPHY 402 - Water and Society 3
- GPHY 411 - Biogeography 3
- GPHY 425 - Geographic Thought 3
- GPHY 431 - Historical Geography 3
- GPHY 441R - Mountain Geography 3
- GPHY 457 - Adv GPS Mapping for GIS 3
- GPHY 461 - Tourism Planning 3
- GPHY 492 - Independent Study 3
- GPHY 498 - Internship 3
- ERTH 432R - Surface Water Resources 3
- GPHY 498R - Internship 4
- Take EITHER:
  - STAT 216Q - Introduction to Statistics
  - STAT 217Q - Intermediate Statistical Concepts
- OR
  - STAT 332 - Statistics for Scientists and Engineers
- Take ONE of the following:
  - WRIT 201 - College Writing II
  - WRIT 221 - Intermediate Tech Writing
- Take ONE of the following:
  - DDSN 114 - Introduction to CAD
  - SRVY 230 - Intro to Surveying for Engineers
- **Year Total:** 30

**University Core, Prerequisites and Electives**

- **Year Total:** 30

**Senior Year**

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>GPHY 484R</td>
<td>Advanced GIS &amp; Spatial Analysis</td>
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</tr>
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</table>

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  - DDSN 114 - Introduction to CAD
  - SRVY 230 - Intro to Surveying for Engineers
- **Year Total:** 30

**University Core, Prerequisites and Electives**

- **Year Total:** 30
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 411 - Methods for Data Analysis I</td>
<td></td>
</tr>
<tr>
<td>STAT 412 - Methods for Data Analysis II</td>
<td></td>
</tr>
<tr>
<td>STAT 436 - Introduction to Time Series Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 446 - Sampling</td>
<td></td>
</tr>
<tr>
<td>CSCI 440 - Database Systems</td>
<td></td>
</tr>
<tr>
<td>SRVY 375 - Analytic Photogrammetry and Remote Sensing</td>
<td></td>
</tr>
</tbody>
</table>

**University Core, Prerequisites and Electives**: 8-9

**Year Total**: 30

**Total Program Credits**: 120 or 121

* Students are required to take 3 credits of ERTH 102CS to fulfill department requirements as well as Core 2.0

**Note**: A minimum of 120 credits is required for graduation; 42 of these credits must be in courses numbered 300 or above.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.