The BS degree in Geographic Information Science and Technology (GIST) requires coursework in either the Computation, Design, and Analysis (CDA) track, Earth Systems Analysis (ESA) track, or the Human Systems and Society (HSS) track.

The Earth Systems and Analysis (ESA) track is designed to attract students interested in applying GIST to physical geography. It applies geospatial technologies to the study of the Geosciences and assessing the Earth's natural resources by providing students with a foundation in biogeography, climate, geomorphology, soil science, geology, ecosystem science, as well as a strong grounding in GIST.

Students will receive a rigorous and modern-day education and training in GIST with application knowledge in physical and human geography. Employers require problem solvers, not button pushers, to address problems in various application domains. The B.S. in GIST is designed to:

- Provide modern-day exposure to the rapidly changing field of GIST
- Balance education and training with a focus on competency
- Provide application and problem-solving experiences
- Support student activities and research
- Provide students with professional experience
- Produce high-quality geographers with strong GIST knowledge and skills

Geospatial technology graduates are in extremely high demand and, according to the U.S. Department of Labor, are one of the highest growth areas in the federal government, particularly in homeland security activities, as well as in energy, software and engineering firms, biomedical and biohazard research, among many others. A 35% annual rate of growth in geospatial technology-related degrees are projected by the U.S. Department of Labor. Students have employment opportunities with the following corporate and government entities:

- Government agencies (federal, state, county, and city): management and planning of urban infrastructure, inventory and assessment of natural resources including agriculture, forestry, and water resources.
- Energy industry: assessing biofuel production and identifying locations suitable for renewable energy resources and mineral exploration.
- Health science industry: determine hotspots of health events and explore causes.
- Military and intelligence community: numerous opportunities exist in military branches and agencies such as the Central Intelligence Agency, National Security Agency, and other intelligence organizations.
- Commercial industries: business analytics and marketing, as spatial information can be used to target marketing campaigns, and suitable site assessment to locate companies.
- Geospatial industries: software development, geotechnical engineering, and technology development.

Students select courses with the assistance of the academic advisor in an individualized advising system.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>GEOG 203 &amp; GEOG 213</td>
<td>Planet Earth and Planet Earth Lab</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>MATH 140</td>
<td>Mathematics for Business and Social Sciences</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATMO 201 &amp; ATMO 202</td>
<td>Weather and Climate and Weather and Climate Laboratory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOC 101</td>
<td>Botany</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOC 111</td>
<td>Introductory Biology I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 119</td>
<td>Fundamentals of Chemistry I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOL 101 &amp; GEOL 102</td>
<td>Principles of Geology and Principles of Geology Laboratory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHYS 201</td>
<td>College Physics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a>)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>GEOG 201</td>
<td>Introduction to Human Geography</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 142</td>
<td>Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Life and physical sciences</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOC 107</td>
<td>Zoology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOC 112</td>
<td>Introductory Biology II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 120</td>
<td>Fundamentals of Chemistry II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOL 106</td>
<td>Historical Geology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHYS 202</td>
<td>College Physics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OCN 251 &amp; OCN 252</td>
<td>Oceanography and Oceanography Laboratory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a>)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Semester Credit Hours 14

Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>GEOG 232</td>
<td>Cartography and Visualization</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>American history (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a>)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creative arts (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts</a>)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Semester Credit Hours 16
<table>
<thead>
<tr>
<th>Social and behavioral sciences</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

**Spring**

- GEOG 352/GEOL 352: GNSS in the Geosciences | 3 |
- STAT 303: Statistical Methods | 3 |
- Select one of the following: | 3 |
  - GEOG 324: Global Climatic Regions
  - GEOG 331: Geomorphology
  - GEOG 335: Pattern and Process in Biogeography

**American history**

- American history | 3 |
- Language, philosophy and culture | 3 |
- Semester Credit Hours | 15 |

**Third Year**

**Fall**

- GEOG 361: Remote Sensing in Geosciences | 4 |
- GEOG 390: Principles of Geographic Information Systems | 4 |
- Select one of the following: | 3 |
  - GEOG 304: Economic Geography
  - GEOG 306: Introduction to Urban Geography
  - GEOG 311: Cultural Geography
- Select one of the following: | 3 |
  - GEOG 324: Global Climatic Regions
  - GEOG 331: Geomorphology
  - GEOG 335: Pattern and Process in Biogeography

**Spring**

- ESSM 459 or GEOG 391: Programming for Spatial Data Applications or Geodatabases | 3 |
- GEOG 312: Data Analysis in Geography | 3 |
- GEOG 475: Advanced Topics in GIS (Geographic Information Systems) | 4 |
- Direct elective | 4 |
- Select one of the following: | 3 |
  - BESC 201: Introduction to Bioenvironmental Sciences
  - BESC 367: U.S. Environmental Regulations
  - BESC 403: Sampling and Environmental Monitoring
  - ESSM 305: Watershed Analysis and Planning
  - ESSM 308: Fundamentals of Environmental Decision-Making
  - ESSM 309: Forest Ecology
  - ESSM 351/RENR 405: Geographic Information Systems for Resource Management
  - ESSM 406: Natural Resources Policy
  - ESSM 440: Wetland Delineation
  - ESSM 464: Spatial Project Management
  - ESSM 477: Terrain Analysis and Mapping

**Fourth Year**

**Fall**

- ESSM 477: Terrain Analysis and Mapping | 4 |
- Directed elective | 6 |
- Select two of the following: | 6 |
  - BESC 201: Introduction to Bioenvironmental Sciences
  - BESC 367: U.S. Environmental Regulations
  - BESC 403: Sampling and Environmental Monitoring
  - ESSM 305: Watershed Analysis and Planning
  - ESSM 308: Fundamentals of Environmental Decision-Making
  - ESSM 309: Forest Ecology
  - ESSM 351/RENR 405: Geographic Information Systems for Resource Management
  - ESSM 406: Natural Resources Policy
  - ESSM 440: Wetland Delineation
  - ESSM 464: Spatial Project Management
  - ESSM 477: Terrain Analysis and Mapping
  - ESSM 478: Advanced Topics in GIS (Geographic Information Systems)
  - GEOL 104: Physical Geology
  - GEOL 306: Sedimentology and Stratigraphy
  - GEOL 410: Hydrogeology
  - RENR 205: Fundamentals of Ecology
  - RENR 470: Environmental Impact Assessment
  - STAT 211: Principles of Statistics I
  - STAT 212: Principles of Statistics II
  - Track elective | 6 |
  - Select 6 hours from the following: | 6 |
    - ESSM 201: Introduction to Bioenvironmental Sciences
    - ESSM 367: U.S. Environmental Regulations
    - ESSM 403: Sampling and Environmental Monitoring
    - ESSM 305: Watershed Analysis and Planning
    - ESSM 308: Fundamentals of Environmental Decision-Making
    - ESSM 309: Forest Ecology
    - ESSM 351/RENR 405: Geographic Information Systems for Resource Management
    - ESSM 406: Natural Resources Policy
    - ESSM 440: Wetland Delineation
    - ESSM 477: Terrain Analysis and Mapping
    - ESSM 478: Advanced Topics in GIS (Geographic Information Systems)
    - GEOL 104: Physical Geology
    - GEOL 306: Sedimentology and Stratigraphy
    - GEOL 410: Hydrogeology
    - RENR 205: Fundamentals of Ecology
    - RENR 470: Environmental Impact Assessment
    - STAT 211: Principles of Statistics I
    - STAT 212: Principles of Statistics II
    - Track elective

**Spring**

- ESSM 464: Spatial Project Management | 4 |
- GEOL 104: Physical Geology | 4 |
- GEOL 306: Sedimentology and Stratigraphy | 4 |
- GEOL 410: Hydrogeology | 4 |
- RENR 205: Fundamentals of Ecology | 4 |
- RENR 470: Environmental Impact Assessment | 4 |
- STAT 211: Principles of Statistics I | 4 |
- STAT 212: Principles of Statistics II | 4 |
- Track elective | 6 |
- Select 6 hours from the following: | 6 |
  - ESSM 201: Introduction to Bioenvironmental Sciences
  - ESSM 367: U.S. Environmental Regulations
  - ESSM 403: Sampling and Environmental Monitoring
  - ESSM 305: Watershed Analysis and Planning
  - ESSM 308: Fundamentals of Environmental Decision-Making
  - ESSM 309: Forest Ecology
  - ESSM 351/RENR 405: Geographic Information Systems for Resource Management
  - ESSM 406: Natural Resources Policy
  - ESSM 440: Wetland Delineation
  - ESSM 464: Spatial Project Management
  - ESSM 477: Terrain Analysis and Mapping
  - ESSM 478: Advanced Topics in GIS (Geographic Information Systems)
  - GEOL 104: Physical Geology
  - GEOL 306: Sedimentology and Stratigraphy
  - GEOL 410: Hydrogeology
  - RENR 205: Fundamentals of Ecology
  - RENR 470: Environmental Impact Assessment
  - STAT 211: Principles of Statistics I
  - STAT 212: Principles of Statistics II
  - Track elective

**Track elective**

- Select 6 hours from the following: | 6 |
  - ESSM 201: Introduction to Bioenvironmental Sciences
  - ESSM 367: U.S. Environmental Regulations
  - ESSM 403: Sampling and Environmental Monitoring
  - ESSM 305: Watershed Analysis and Planning
  - ESSM 308: Fundamentals of Environmental Decision-Making
  - ESSM 309: Forest Ecology
  - ESSM 351/RENR 405: Geographic Information Systems for Resource Management
  - ESSM 406: Natural Resources Policy
  - ESSM 440: Wetland Delineation
  - ESSM 464: Spatial Project Management
  - ESSM 477: Terrain Analysis and Mapping
  - ESSM 478: Advanced Topics in GIS (Geographic Information Systems)
  - GEOL 104: Physical Geology
  - GEOL 306: Sedimentology and Stratigraphy
  - GEOL 410: Hydrogeology
  - RENR 205: Fundamentals of Ecology
  - RENR 470: Environmental Impact Assessment
  - STAT 211: Principles of Statistics I
  - STAT 212: Principles of Statistics II
  - Track elective

**Direct elective**

- Select one of the following: | 3 |
  - BESC 201: Introduction to Bioenvironmental Sciences
  - BESC 367: U.S. Environmental Regulations
  - BESC 403: Sampling and Environmental Monitoring
  - ESSM 305: Watershed Analysis and Planning
  - ESSM 308: Fundamentals of Environmental Decision-Making
  - ESSM 309: Forest Ecology
  - ESSM 351/RENR 405: Geographic Information Systems for Resource Management
  - ESSM 406: Natural Resources Policy
  - ESSM 416: Fire Ecology and Natural Resource Management
  - ESSM 440: Wetland Delineation
  - ESSM 464: Spatial Project Management
  - ESSM 477: Terrain Analysis and Mapping
  - ESSM 478: Advanced Topics in GIS (Geographic Information Systems)
  - GEOL 104: Physical Geology
  - GEOL 306: Sedimentology and Stratigraphy
  - GEOL 410: Hydrogeology
  - RENR 205: Fundamentals of Ecology
  - RENR 470: Environmental Impact Assessment
  - STAT 211: Principles of Statistics I
  - STAT 212: Principles of Statistics II
  - Track elective

**Track elective**

- Select 6 hours from the following: | 6 |
  - ESSM 201: Introduction to Bioenvironmental Sciences
  - ESSM 367: U.S. Environmental Regulations
  - ESSM 403: Sampling and Environmental Monitoring
  - ESSM 305: Watershed Analysis and Planning
  - ESSM 308: Fundamentals of Environmental Decision-Making
  - ESSM 309: Forest Ecology
  - ESSM 351/RENR 405: Geographic Information Systems for Resource Management
  - ESSM 406: Natural Resources Policy
  - ESSM 440: Wetland Delineation
  - ESSM 464: Spatial Project Management
  - ESSM 477: Terrain Analysis and Mapping
  - ESSM 478: Advanced Topics in GIS (Geographic Information Systems)
  - GEOL 104: Physical Geology
  - GEOL 306: Sedimentology and Stratigraphy
  - GEOL 410: Hydrogeology
  - RENR 205: Fundamentals of Ecology
  - RENR 470: Environmental Impact Assessment
  - STAT 211: Principles of Statistics I
  - STAT 212: Principles of Statistics II
  - Track elective
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 442/GEOS 442</td>
<td>Past Climates</td>
<td></td>
</tr>
<tr>
<td>GEOG 450</td>
<td>Field Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 461</td>
<td>Digital Image Processing in the Geosciences</td>
<td></td>
</tr>
<tr>
<td>GEOG 467</td>
<td>Dynamic Modeling of Earth and Environmental Systems</td>
<td></td>
</tr>
<tr>
<td>GEOG 478</td>
<td>WebGIS</td>
<td></td>
</tr>
<tr>
<td>GEOS 410</td>
<td>Global Change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 479</td>
<td>Principles of Geocomputation</td>
<td>4</td>
</tr>
<tr>
<td>GEOG 476</td>
<td>GIS Practicum</td>
<td>3</td>
</tr>
<tr>
<td>Directed elective</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Select three of the following:</td>
<td></td>
</tr>
<tr>
<td>BESC 201</td>
<td>Introduction to Bioenvironmental Sciences</td>
<td></td>
</tr>
<tr>
<td>BESC 367</td>
<td>U.S. Environmental Regulations</td>
<td></td>
</tr>
<tr>
<td>BESC 403</td>
<td>Sampling and Environmental Monitoring</td>
<td></td>
</tr>
<tr>
<td>ESSM 305</td>
<td>Watershed Analysis and Planning</td>
<td></td>
</tr>
<tr>
<td>ESSM 308</td>
<td>Fundamentals of Environmental Decision-Making</td>
<td></td>
</tr>
<tr>
<td>ESSM 309</td>
<td>Forest Ecology</td>
<td></td>
</tr>
<tr>
<td>ESSM 351/RENR 405</td>
<td>Geographic Information Systems for Resource Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 406</td>
<td>Natural Resources Policy</td>
<td></td>
</tr>
<tr>
<td>ESSM 416</td>
<td>Fire Ecology and Natural Resource Management</td>
<td></td>
</tr>
<tr>
<td>ESSM 440</td>
<td>Wetland Delineation</td>
<td></td>
</tr>
<tr>
<td>ESSM 464</td>
<td>Spatial Project Management</td>
<td></td>
</tr>
<tr>
<td>GEOL 104</td>
<td>Physical Geology</td>
<td></td>
</tr>
<tr>
<td>GEOL 306</td>
<td>Sedimentology and Stratigraphy</td>
<td></td>
</tr>
<tr>
<td>GEOL 410</td>
<td>Hydrogeology</td>
<td></td>
</tr>
<tr>
<td>RENR 205</td>
<td>Fundamentals of Ecology</td>
<td></td>
</tr>
<tr>
<td>RENR 470</td>
<td>Environmental Impact Assessment</td>
<td></td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
<td></td>
</tr>
<tr>
<td>STAT 212</td>
<td>Principles of Statistics II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Total Semester Credit Hours</td>
<td>120</td>
</tr>
</tbody>
</table>

1. 8 hours required. Department requires that you take two in the same discipline to meet this requirement.
2. Track electives comprise 6 hours of focused coursework. The track and specific courses within the track are to be chosen in consultation with the advisor and/or faculty mentor.
3. 19 hours required. To be selected from the following or chosen in consultation with an advisor.

Two courses in the degree plan must be Writing Intensive courses designated by the department in the schedule of classes. Also, International and Cultural Diversity Elective (3 hours) and Cultural Discourse (3 hours) must be incorporated into the degree.