# SPATIAL SCIENCES - BS

A degree in Spatial Sciences offers students the opportunity to obtain a career in a cutting-edge discipline at the intersection of environmental and spatial sciences. The spatial sciences combine multidisciplinary fields of scientific study with geospatial technologies including Geographic Information Systems (GIS), Global Positioning Systems (GPS), and Remote Sensing. A spatial sciences graduate will possess an advanced knowledge of these technologies, experience in interpretation of aerial photographs and processing of satellite images, as well as a broad understanding of computer applications and database management. Graduates are capable of working as environmental and natural resource managers and possess the necessary skills to map geographical features, patterns, and changes. Furthermore, these individuals will be able to lead and conduct modern environmental management activities.

Through core and supporting coursework, students will learn to utilize the full potential of the spatial sciences in real-world problem solving. From real-time wildfire risk assessment to crime analysis, habitat mapping for endangered species, and evaluating environmental damage from natural disasters, the spatial sciences are an integral part of modern resource management.

Students in this degree program receive guidance from faculty advisors in their areas of interest and meet regularly to discuss courses and career opportunities.

## Program Requirements

**First Year**

| **Fall** | | **Semester Credit Hours** |
|---|---|---|
| AGEC 105 | Introduction to Agricultural Economics | 3 |
| ESSM 201 | Exploring Ecosystem Science and Management | 1 |
| RENR 205 & RENR 215 | Fundamentals of Ecology and Fundamentals of Ecology--Laboratory | 4 |
| Select one of the following: | | 4 |
| BIOL 101 | Botany | |
| BIOL 113 | Essentials in Biology | |
| HORT 201 & HORT 202 | Horticultural Science and Practices and Horticultural Science and Practices Laboratory | |
| Communication (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication) [1] | | 3 |
| | Semester Credit Hours | 15 |
| **Spring** | | |
| CHEM 119 | Fundamentals of Chemistry I | 4 |
| ESSM 281 | Seminar in Ecosystem Science and Management | 1 |
| American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) [1] | | 3 |
| Communication (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication) [1] | | 3 |
| Mathematics (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#mathematics) | | 3 |
| | Semester Credit Hours | 14 |

**Second Year**

| **Fall** | | |
|---|---|---|
| ESSM 351/ RENR 405 | Geographic Information Systems for Resource Management | 3 |
| American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) [1] | | 3 |
| Government/Political science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science) [1,3] | | 3 |
| Mathematics (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#mathematics) | | 3 |
| Emphasis area elective [2] | | 3 |
| | Semester Credit Hours | 15 |
| **Spring** | | |
| ESSM 301 | Wildland Watershed Management | 3 |
| ESSM 306 or ESSM 311 | Plant Functional Ecology and Adaptation or Biogeochemistry and Global Change | 3 |
| ESSM 313 | Vegetation Sampling Methods and Designs in Ecosystems | 3 |
| Government/Political science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science) [1,3] | | 3 |
| Emphasis area elective [2] | | 3 |
| | Semester Credit Hours | 15 |
| **Summer** | | |
| SCSC 301 | Soil Science | 4 |
| Language, philosophy and culture (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture) [1] | | 3 |
| | Semester Credit Hours | 7 |

**Third Year**

| **Fall** | | |
|---|---|---|
| ESSM 203 or ESSM 302 | Forest Trees of North America or Wildland Plants of North America | 3 |
| ESSM 444 | Remote Sensing of the Environment | 3 |
| ESSM 461 | Spatial Databases for Data Storage, Manipulation and Analysis | 3 |
| Select one of the following: | | 3 |
| ESSM 318 | Coupled Social and Ecological Systems | |
| ESSM 404 | Changing Natural Resource Policy | |
| ESSM 406 | Natural Resources Policy | |
| AGEC 350 | Environmental and Natural Resource Economics | |
| RENR 470 | Environmental Impact Assessment | |
| Emphasis area elective [2] | | 3 |
| | Semester Credit Hours | 15 |
| **Spring** | | |
| ESSM 459 | Programming for Spatial Data Applications | 3 |
| Select one of the following: | | 3 |

| | | |
|---|---|---|
| AGEC 350 | Environmental and Natural Resource Economics | |
| ESSM 318 | Coupled Social and Ecological Systems | |
| ESSM 406 | Natural Resources Policy | |
| RENR 470 | Environmental Impact Assessment | |
| Select one of the following: | | 3 |
| ESSM 317 | Vegetation Management | |
| ESSM 319 | Principles of Forestry | |
| ESSM 320 | Ecosystem Restoration and Management | |
| Creative arts (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts) [1] | | 3 |
| Emphasis area elective [2] | | 3 |
| | Semester Credit Hours | 15 |
| **Fourth Year** | | |
| **Fall** | | |
| ESSM 481 | Senior Seminar | 1 |
| Emphasis area elective [2] | | 3 |
| Emphasis area elective [2] | | 3 |
| General elective | | 3 |
| General elective | | 2 |
| | Semester Credit Hours | 12 |
| **Spring** | | |
| ESSM 462/ GEOG 462 | Advanced GIS Analysis for Natural Resource Management | 3 |
| ESSM 464 | Spatial Project Management | 3 |
| Emphasis area elective [2] | | 3 |
| Emphasis area elective [2] | | 3 |
| | Semester Credit Hours | 12 |
| | Total Semester Credit Hours | 120 |

1 Graduation requirements include a requirement for three hours of International and Cultural Diversity (http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/) courses and three hours of Cultural Discourse (http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/) courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See an academic advisor.

2 To be selected from an approved list in consultation with an academic advisor.

3 Credit by examination may be used to substitute 3 hours of POLS 206 or POLS 207.