Geospatial Information Sciences (B.S.)

Geospatial Information Science (or GIScience) is the quantitative study of relationships of things in space and time. In recent years, powerful new technologies and techniques have emerged that greatly improve our ability to acquire, archive, analyze and communicate information regarding people, places and other things on or near the Earth's surface. These same technologies and techniques allow us to combine this information into multi-tiered databases describing the physical, social and other aspects of all or portions of the Earth. Such databases can then be analyzed in novel ways that take the data's spatial nature into account. The insights produced by these sorts of databases and analyses are revolutionizing many fields of science, government and business, and through now-commonplace consumer products such as web-based mapping systems and GPS units, are directly impacting the everyday lives of ordinary individuals.

Graduates of the Bachelor of Science in Geospatial Information Science program will understand the logical, mathematical and technological underpinnings of GIScience, and be skilled in solving geospatial problems to the point where they will be able to move into professional roles handling the geospatial needs facing typical corporate, government, and nonprofit organizations. Their level of understanding will transcend simple familiarity with common GIScience software packages; while these graduates will be skilled in the use of such systems, they will also understand the underlying principles upon which software systems are based. This will allow our graduates to transfer their knowledge from one software system to another, and more importantly, to view geospatial problems as issues that can be solved by applying basic theories, techniques and methodologies, and not be limited to solutions encapsulated in particular software systems.

Mission and Objectives

The mission of the Bachelor of Science in Geospatial Information Sciences program is to provide students with a rigorous understanding of the fundamental theories and concepts underlying GIScience, as well as to provide them with extensive hands-on experience with contemporary GIScience hardware and software. However, this program should not be confused with software training seminars or workshops; the goal of the Bachelor of Science in GIScience program is to give students a firm grasp on the theories, ideas and techniques that underlay software and hardware systems, and thus provide them with a foundation of knowledge and skill that transcends any individual piece of hardware or software. Graduates of this program will be able to successfully compete for professional positions within GIScience and related fields, and be admitted into the best graduate schools globally.

Students within the program will:

- Demonstrate their understanding of the underlying theories, ideas, concepts and techniques
Master contemporary computer hardware and software systems commonly employed in GIScience.

• Demonstrate problem solving skills that employ their understanding of theories, ideas and concepts as well as their mastery of GIScience software and hardware.

Bachelor of Science in Geospatial Information Sciences
Degree Requirements (120 hours)

I. Core Curriculum Requirements\(^1\): 42 hours

**Communication (6 hours)**

  3 hours Communication (RHET 1302)
  3 hours Communication Elective (GEOG 3377)

**Social and Behavioral Sciences (15 hours)**

  6 hours Government (GOVT 2301 and GOVT 2302)
  6 hours American History (HIST 1301 and HIST 1302)
  3 hours Social and Behavioral Sciences Elective (SOC 1301, SOC 2319, CRIM 1301, or CRIM 1307)

**Humanities and Fine Arts (6 hours)**

  3 hours Fine Arts (ARTS 1301)
  3 hours Humanities (HUMA 1301)

**Mathematics and Quantitative Reasoning (6 hours)**

  3 hours Mathematics (MATH 1325, MATH 2413 or MATH 2417)\(^2\)
  3-4 hours Quantitative Reasoning (MATH 1326, MATH 2414 or MATH 2419)\(^2\)

**Science (9 hours)**

  GEOS 1103 Physical Geology Laboratory
  GEOS 1104 History of Earth and Life Laboratory
  GEOS 1303 Physical Geology
  GEOS 1304 History of Earth and Life
  1 hour Science elective

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2. Students must complete a total of 42 hours for the Core Curriculum.
II. Major Requirements: 61 hours

Major Preparatory Courses (18 hours beyond Core Curriculum)

- **BIS 3190** Library Research Skills
- **CS 1136** Computer Science Laboratory
- **CS 1336** Programming Fundamentals
- **CS 1337** Computer Science I
- **CS 2336** Computer Science II
- **EPPS 3405** Introduction to Social Statistics with Lab
- **MATH 1325** Applied Calculus I\(^3\)
  - or **MATH 2413** Differential Calculus\(^2,3\)
  - or **MATH 2417** Calculus I\(^2,3\)
- **MATH 1326** Applied Calculus II\(^3\)
  - or **MATH 2414** Integral Calculus\(^2,3\)
  - or **MATH 2419** Calculus II\(^2,3\)
- **SOCS/ECS 3361** Social Issues and Ethics in Computer Science and Engineering

Major Core Courses (21 hours)

- **GEOG 3304** Tools for Spatial Analysis
- **GEOG 4380** Spatial Concepts and Organization
- **GISC 2301** Introduction to Geospatial Information Science
- **GISC 2302** Geodesy and Geospatial Analysis
- **GISC 3301** Introduction to Remote Sensing
- **GISC 3382** Applied Geographic Information Systems
- **GISC 4317** Computer Programming for GIS

Major Related Courses (22 hours)

- **MIS 3300** Introduction to Management Information Systems
- **CGS 4352** Human Computer Interactions I
- **GEOG 3331** Urban Growth and Structure
- **GEOG 3357** Spatial Dimensions of Health and Disease
III. Elective Requirements: 17 hours

Free Electives (17 hours)

This requirement may be satisfied with lower- and upper-division courses from any field of study. Students must complete at least 51 hours of upper-division credit to qualify for graduation.

1. Curriculum Requirements can be fulfilled by other approved courses, including courses from accredited institutions of higher education. The courses listed in parentheses are the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.

2. Three hours are counted under Mathematics and/or Quantitative Reasoning core, and two hours are counted under Major Preparatory Courses.

3. A Major requirement that also fulfills a Core Curriculum requirement. Hours are counted in Core Curriculum above.