School of Economic, Political and Policy Sciences

Geospatial Information Sciences (BS)

Geospatial Information Science (or GIScience) is the study of relationships between phenomena 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 explicit spatial (or locational) nature into account. The insights produced by analyzing these types of databases are revolutionizing many fields of science, government, and business. Currently, commonplace consumer products such as web-based mapping systems and GPS units that incorporate locational information are directly impacting the everyday lives of ordinary individuals.

Graduates of the Bachelors of Science in Geospatial Information Science program will understand the logical, mathematical, and technological foundations for compiling and analyzing spatial data. They will be skilled in solving geospatial problems, enabling them to move into professional roles handling the geospatial needs of typical corporate, government, and nonprofit organizations. The graduates will not only be skilled in the use of common GIScience software systems, but also will understand the underlying principles upon which software systems are based. This will allow them to transfer their knowledge from one software system to another, to expand the capabilities of these systems, and most importantly, to view geospatial problems as issues that can be solved by applying basic theories, techniques and methodologies.

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. The goal of the program is to give students a firm grasp of the theories, ideas, and techniques that underlay software and hardware systems for the compilation and analysis of spatially referenced data, and thus provide them with a foundation of knowledge and skill that transcends any individual piece of software or hardware. 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 of GIScience.
• Master contemporary computer hardware and software systems commonly employed in
• 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 semester credit hours)¹

Faculty

Professors: Brian J. L. Berry, Denis J. Dean, Daniel A. Griffith, Fang Qiu, May Yuan
Associate Professors: Yongwan Chun, Dohyeong Kim, Michael Tiefelsdorf
Assistant Professor: Anthony R. Cummings
Senior Lecturers: Irina Vakulenko

I. Core Curriculum Requirements: 42 semester credit hours²

Communication: 6 semester credit hours

COMM 1311 Survey of Oral and Technology-based Communication
RHET 1302 Rhetoric

Mathematics: 3 semester credit hours

MATH 1325 Applied Calculus I³

Life and Physical Sciences: 6 semester credit hours

Choose two courses from the following:

GEOS 1303 Physical Geology
ENVR 2302 or GEOG 2302 or GEOS 2302 The Global Environment³
NATS 1311 From the Cosmos to Earth
NATS 2333 Energy, Water, and the Environment
PHYS 1301 College Physics I

Language, Philosophy and Culture: 3 semester credit hours

Choose one course from the following:

AMS 2341 American Studies for the Twenty-First Century
HUMA 1301 Exploration of the Humanities
LIT 2331 Masterpieces of World Literature
PHIL 1301 Introduction to Philosophy

Creative Arts: 3 semester credit hours
Choose one course from the following:
AHST 1303 Survey of Western Art History: Ancient to Medieval
AHST 1304 Survey of Western Art History: Renaissance to Modern
AHST 2331 Understanding Art
ARTS 1301 Explorations of the Arts

American History: 6 semester credit hours
Choose two courses from the following:
HIST 1301 U.S. History Survey to Civil War
HIST 1302 U.S. Survey from Civil War
HIST 2301 History of Texas

Government / Political Science: 6 semester credit hours
GOVT 2305 American National Government
GOVT 2306 State and Local Government

Social and Behavioral Sciences: 3 semester credit hours
Choose one course from the following:
CRIM 1301 Introduction to Criminal Justice
CRIM 1307 Introduction to Crime and Criminology
ECON 2301 Principles of Macroeconomics
ECON 2302 Principles of Microeconomics
GEOG 2303 People and Place: An Introduction to World Geographic Regions
SOC 1301 Introduction to Sociology

Component Area Option: 6 semester credit hours
EPPS 2301 Research Design in the Social and Policy Sciences
And choose one course from the following:
II. Major Requirements: 42 semester credit hours

Major Preparatory Courses: 9 semester credit hours beyond Core Curriculum

- **ENVR 2302** or **GEOG 2302** or **GEOS 2302** The Global Environment\(^3\)
- **EPPS 2302** Methods of Quantitative Analysis in the Social and Policy Sciences\(^3\)
- or **EPPS 2303** Descriptive and Inferential Statistics for the Social and Policy Sciences\(^3\)
- **GEOG 2303** People and Place: An Introduction to World Geographic Regions\(^3\)
- **GEOG 3370** The Global Economy
- **GEOG 3377** or **PA 3377** Urban Planning and Policy
- **MATH 1325** Applied Calculus I\(^3\)
- **MATH 1326** Applied Calculus II

Major Core Courses: 18 semester credit hours

- **GISC 2305** or **GEOS 2305** Spatial Thinking and Data Analytics
- **GISC 3304** or **GEOG 3304** or **GEOS 3304** Principles of Geospatial Information Sciences
- **GISC 4380** or **GEOG 4380** or **GEOS 4380** Spatial Concepts and Organization
- **GISC 4325** or **GEOS 4325** Introduction to Remote Sensing
- **GISC 4382** Applied Geographic Information Systems
- **GISC 4386** Global Change and Its Challenges

Concentrations: 15 semester credit hours in ONE of the following concentration areas

**Geography**

- **GEOG 3331** Urban Growth and Structure
- **GEOG 3357** Spatial Dimensions of Health and Disease\(^4\)
- **GEOG 3359** Human Migration and Mobility\(^4\)
- **GEOG 3372** Population and Development
- **GEOG 3382** Russia: Yesterday, Today and Tomorrow\(^4\)

**GeoComputation and GeoVisualization**
GISC 4317  GeoComputation
GISC 4326  Cartography and GeoVisualization
GISC 4384  Health and Environmental GIS: A Global Perspective
GISC 4385  Advanced Applications in GIS
ITSS 3300  Information Technology for Business

III. Elective Requirements: 36 semester credit hours

Prescribed Electives: 15 semester credit hours

All students are required to take at least fifteen semester credit hours of prescribed upper-division elective courses.

Free Electives: 21 semester credit hours

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

1. Incoming freshmen must enroll and complete requirements of UNIV 1010 and the corresponding school-related freshman seminar course. Students, including transfer students, who complete their core curriculum at UT Dallas must take UNIV 2020.

2. Curriculum Requirements can be fulfilled by other approved courses from institutions of higher education. The courses listed are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.

3. A Major requirement that also fulfills a Core Curriculum requirement. Semester credit hours are counted in Core Curriculum.

4. Alternative courses, as approved by the program head, may be used to satisfy this requirement.

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