

DEPARTMENT OF GEOGRAPHY AND GEOLOGY

About

Chair

Brian Cooper (bio_bjc@shsu.edu)

Mission

The primary mission of the Department of Geography and Geology is to provide students of the two complementary programs a comprehensive understanding of the range and depth of these scientific disciplines which encompass, respectively, the human and physical domains of geography, and the physical and historical domains of geology. This understanding is intended to enable our students to achieve their full potential as skilled professionals and well-qualified technical employees in a diverse range of companies and governmental organizations, and to become effective teachers and community leaders. Our programs enable students to become informed users of a range of technologies and prudent stewards of our natural resources. This understanding of the world will promote successful careers, active life-long learning, and an ability and desire to contribute positively to society.

Contact Information

(936) 294-1451

Website

www.shsu.edu/~gel_geo (http://www.shsu.edu/~gel_geo)

Highlights

Located on the third floor of the Lee Drain Building, the department maintains both a Geographic Information System (GIS) lab and a combination GIS and remote sensing lab. These labs contain state-of-the-art computers, software and scanners. We also have a van for fieldtrips, a pickup truck and trailer used for field research, a coring device capable of taking up to 6m core samples, high-quality GPS receivers, a large-scale flume to demonstrate sedimentation processes, and a Ground Penetrating Radar System. In order to enhance learning, all of our rooms are outfitted with video-projection systems, and our lecture rooms have sound systems and dedicated computers with Internet access that are used by the instructors for teaching purposes. Many of our students obtain internships and work with faculty members on research projects.

Career Opportunities

Because of the breadth of geography, there are a wide variety of career opportunities for geography graduates. These opportunities include careers in the following:

- surveying and geomatics
- geophysics
- wetlands delineation
- water quality analysis
- photogrammetry
- urban planning
- computer mapping and geospatial technologies
- environmental companies and state environmental agencies
- state transportation departments
- city, county, state, and federal government
- education
- historical preservation
- marketing agencies
- energy companies
- emergency management and law enforcement
- tourism
- military

Geography's focus on spatial relationships, in conjunction with new advances in technology, have led to the development of new geographical tools—principally Geographic Information Systems (GIS) and Global Positioning Systems (GPS)—that are now used by many geographers in a wide variety of fields. Because these technologies can be applied within virtually any field (government, business, military, etc.) it is one of the fastest growing job fields and the demand for people with experience using them exceeds the supply. Aside from offering a tract with our program that emphasizes these technologies, we also offer students an Interdisciplinary Minor in GSS that emphasizes GIS, remote sensing and computer cartography. The

combination of geography major and a GSS minor is highly marketable. With their broad background, geography graduates have an ability to see connections where others do not, and this enables geographers to work in many different fields. Geography literally offers a world of opportunities.

- Master of Science in Geographic Information Systems (catalog.shsu.edu/archives/2017-2018/graduate/college-departments/science-and-engineering-technology/geography-geology/geographyic-information-systems-ms)
- Graduate Certificate in Geographic Information Systems (catalog.shsu.edu/archives/2017-2018/graduate/college-departments/science-and-engineering-technology/geography-geology/geographyic-information-systems-certificate)

Student Organizations and Activities

- Geographers of Sam Houston (GOSH) - GOSH is intended to enhance appreciation for geography through club-sponsored field trips, guest lectures, and other activities, and to promote camaraderie among geography students.
- Gamma Theta Upsilon (GTU) - GTU is the National Geography Honor Society and was established to promote geographic awareness and the pursuit of geographic knowledge. To be eligible for membership in this honor society, students must have at least 12 hours of geography coursework, a minimum GPA of 3.25 in their geography coursework, and an overall GPA of at least 3.0.

Internships

Educational and research opportunities using GIS are available through a variety of internship opportunities that will increase students' skills and employment opportunities.

Scholarships

- THE GRADUATE ACADEMIC ACHIEVEMENT SCHOLARSHIP: A competitive scholarship awarded to graduate students whose academic accomplishments and university or community citizenship are excellent in every respect. This competitive scholarship is intended for a full-time student enrolled as a resident, nonresident or a citizen of a country other than the United States of America, maintaining not less than a 3.50 GPA. The award amount is determined on the availability of funds—for summer semester only.
- AMATO BROTHERS SCHOLARSHIP: \$3,000 per year; Recipient must be a full-time undergraduate or graduate student, majoring in any discipline, demonstrate financial need, and exhibit commitment to continue and complete their education. The recipient must maintain not less than a 2.5 GPA in major and overall.
- COLLEGE OF SCIENCES SPECIAL GRADUATE SCHOLARSHIP: This is a prestigious scholarship from the College of Sciences. It is awarded each fall and spring semester to select graduate students whose academic accomplishments and university or community citizenship are excellent in every respect. \$1,500 per semester is awarded. Recipient must be a Sam Houston State University graduate student enrolled full-time. Application deadlines: Fall Semester—April 1; Spring Semester—November 1.
- OFFICE OF GRADUATE STUDIES SCHOLARSHIP: The Office of Graduate Studies offers a scholarship intended to recruit and retain high-quality graduate students. Nominations need to be made by the graduate advisor. See the Graduate Studies website for more information.
- JAMES ELLISON KIRKLEY AWARD: Two awards (amounts vary) to majors in history, political science, geography, or sociology. Recipients are selected on basis of high academic achievement.

Geography

GEOG 5075. Selected Problems in Geography. 1-3 Hours.

This course is designed for individual students who wish intensive supervision in their research or study of special topics in the field of Geography. Variable Credit (1-3)..

GEOG 5310. GIS Project Management. 3 Hours.

Management strategies for GIS are examined by presenting GIS as an integrated system of people, computer hardware, software, applications, and data. The course includes design of implementation plans as case studies to explore various techniques associated with each step of this process.

Prerequisite: GEOG 5361, GEOG 5362.

GEOG 5311. GIS in Law Enforcement. 3 Hours.

The primary foci of this course are the application of geospatial technologies in law enforcement and national security. Course topics will include the characteristics of geospatial intelligence and crime incident data, the use of GPS imagery and the application of other geospatial technologies. Students will use methods of spatial analysis to study a variety of public safety phenomena, such as heat mapping, change detection and geographic profiling.

GEOG 5312. GIS ModelBuilder. 3 Hours.

This course focuses on theories, topics and concepts that provide students a strong understanding of ModelBuilder, a program designed to create automated routines and workflows within a GIS environment. Through the development of skills and techniques with ModelBuilder, students learn how to create, use, and share interactive models within the ArcGIS platform. They will also learn how to document models so others can use them for their own intended purposes.

Prerequisite: GEOG 5362.

GEOG 5361. Geographic Information. 3 Hours.

This course examines how geospatial data are obtained, created, edited and utilized. This includes examination of the availability and accuracy of geospatial data, geospatial portals, and the digitizing and scanning of geographic data. The creation and structure of attribute databases, and relational and object-oriented data structures also will be discussed.

GEOG 5362. GIS Principles And Application. 3 Hours.

Basic principles of geographic information systems and their application will be addressed. Structure and functionality of raster and vector based GIS, history of GIS development and evolution, management of attribute data, creation of geospatial data and applications in numerous fields will be covered as well as new developments in the field.

GEOG 5363. Internet Gis. 3 Hours.

This course introduces the principles and practices of interactive mapping and GIS data distribution across the Internet. Students will learn to develop Internet GIS applications using Arc Internet Map Server (ArcIMS).

GEOG 5364. Spatial Analysis. 3 Hours.

This course introduces the fundamental knowledge and techniques of spatial analysis. It teaches students how to effectively use various spatial data to solve real-world problems. Topics covered include spatial data structure, multiple layer operations, point pattern analysis and network analysis. Prerequisite GEOG 5361.

GEOG 5365. Digital Image Processing. 3 Hours.

Students will develop theoretical understanding and technical proficiency in remote sensing image analysis. Students will perform image processing functions and will be exposed to all critical phases of project implementation expected of an image analyst. Extensive lab exercises are required.

Prerequisite: GEOG 5361.

GEOG 5366. Cartography And Visualization. 3 Hours.

This course introduces the art, science, and techniques used in modern automated cartography and visualization. Emphasis will be placed on thematic mapping and surface rendering. Extensive computer lab exercises are required.

Prerequisite: GEOG 5361.

GEOG 5367. GIS Programming. 3 Hours.

This course teaches students to use Visual Basic for Application (VBA) to develop customized GIS applications. Students will become familiar with the fundamental concepts in object-oriented programming and develop programming skills.

Prerequisite: GEOG 5361.

GEOG 5368. Gis Program Use And Applicatns. 3 Hours.

This is an Internet-based course that requires the successful completion (as indicated by printed certificates) of ten related courses pertaining to GIS program use and applications. The courses are taken through the Environmental Systems Research Institute's (ESRI) on-line virtual campus.

Prerequisite: GEOG 5361, GEOG 5362, GEOG 5364.

GEOG 5369. Internship In Gis. 3 Hours.

Students will work for either a business or government agency to obtain applied experience in the use of GIS. Students must be supervised by a member of the graduate faculty, who will determine whether the nature and amount of the work performed satisfies the requirements for graduate credit. In addition, students must be evaluated by their employer, and this information must be submitted to the Department Chair to be used in assignment of a grade for the course. Students are encouraged to maintain a journal and to present a paper recounting their internship experiences.

Prerequisite: GEOG 5361, GEOG 5362.

GEOG 5371. Geographic Information Systems in Energy-Related Fields. 3 Hours.

This course focuses on the use and application of GIS and related geospatial technologies within a variety of energy related fields. Technological applications within pipeline routing, reservoir mapping, evaluation and visualization, and environmental assessment will serve as the primary foci. Geospatial aspects of oil and gas production and distribution will also be explored, as will GIS mapping and the management of GIS facilities.

GEOG 5373. Introduction to LiDAR & Radar. 3 Hours.

This course focuses on the concepts and applications of Global Positioning Systems (GPS), Light Detection and Ranging (LiDAR), and Radar systems. Topics include accuracy assessment and appropriate use of LiDAR, Radar, and GPS data products. Students will master the skills needed to use these data products in different applications such as topographic mapping, flood inundation studies, vegetation analysis, and 3D modeling. Course components include lectures, labs, and field work.

Prerequisite: GEOG 5361 or instructor's consent.

GEOG 5374. Advanced GIS Analysis. 3 Hours.

Students will learn to systematically and effectively formulate, organize, and implement an advanced GIS analysis project. Topics include defining research problems, collecting and preparing data, designing analytical methods, and interpreting results. Students will perform geostatistical analyses and will learn how to build, modify, and streamline geoprocessing models. Credit 3

Prerequisite: GEOG 5364.

GEOG 6061. Graduate Seminar In GIS. 1-3 Hours.

This is a graduate seminar featuring results of faculty research projects, research work by graduate students, and discussions by invited speakers from government and industry who are using GIS and related technologies.

Prerequisite: GEOG 5361, GEOG 5362, GEOG 5363, GEOG 5364, GEOG 5367.

GEOG 6099. Thesis II. 1-3 Hours.

The student will complete a thesis involving research and study of the applications of geographic information systems and related technologies. The work involved includes research on the approved thesis topic, preparation of a draft and a final thesis. The thesis must be at minimum of thirty pages in length and must be suitable for publication in a peer reviewed journal on the topic. Students must also make a 30 minutes Power Point presentation on the approved topic. Variable Credit (1-3).

Prerequisite: GEOG 5361, GEOG 5362, GEOG 5363, GEOG 5364, GEOG 5367, or consent of graduate supervisor.

GEOG 6398. Thesis I. 3 Hours.

The student will begin work on a thesis involving research and study of the applications of geographic information systems and related technologies.

Prerequisite: GEOG 5361, GEOG 5362, GEOG 5363, GEOG 5364, GEOG 5367.

Geology

GEOL 5095. Spc Grad Topics in Geology. 1-3 Hours.

Individual study in special areas of geology. Topic content to be selected and agreed upon by the students and member of the geology faculty. Variable Credit (1-3).

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