

# GEOGRAPHIC INFORMATION SYSTEMS (GIS)

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## **GIS 105. Fundamentals of Geographic Information Systems**

Credits: 3

Prerequisite: CSCI 101 or a working knowledge of Microsoft Windows.

Typically Offered: FALLSPR

The course provides an introduction to Geographic Information Systems, including how GIS is used for integrating and analyzing spatial data to visualize relationships, seek explanations, and develop solutions to problems. Emphasis is placed on the nature of geographic information, and the ways in which digital methods support geographic analysis. The course is divided between lecture and lab sessions.

## **GIS 107. GIS Applications**

Credits: 3

Prerequisite: GIS 105.

Typically Offered: FALL

The course provides hands-on opportunities to experience the hardware and software used in GIS. The course applies fundamental GIS concepts to creating, editing, and querying spatial data and spatial relationships. Students manipulate data and make decisions from the presented information through various geoprocessing techniques.

## **GIS 201. Advanced GIS Applications**

Credits: 3

Prerequisites: GIS 105 and GIS 107.

Typically Offered: SPRING

An advanced hands-on application course designed to extend GIS knowledge and experience and to prepare students in becoming self-sufficient GIS technicians. The course follows a hands-on, problem-solving approach that integrates the interests and analytical needs of participating students. The course will be divided between lecture and lab sessions.

## **GIS 204. Mobile & Web GIS**

Credits: 3

Typically Offered: SPRING

The emergence of highly capable mobile devices and applications has opened new opportunity for location based services. Apps enable us to collect and analyze data wherever and whenever we are. Mobile apps are generally classified into web apps and native apps. This course covers how to use mobile GIS apps to collect, maintain and process data. Students will create web maps and web apps using field collected data.

## **GIS 206. GIS in Science, Agriculture and Business**

Credits: 3

Typically Offered: FALLSPR

The course integrates the fields of business, agriculture, and science through GIS and Global Positioning Systems (GPS). The course will be divided between lecture, guest speakers who are experts in their fields, and lab sessions that apply fundamental concepts associated with how GIS can complement business, agricultural, and science applications.

## **GIS 215. Introduction to Remote Sensing and Unmanned Aerial Systems (UAS)**

Credits: 3

Prerequisites: GIS 105 and GIS 107.

Typically Offered: SPRING

The course integrates the disciplines of GIS, photogrammetry, remote sensing and UAS data capture. Basic understanding of the electromagnetic spectrum and the physical interaction of light with common earth objects are taught alongside technical skills to apply the concepts. A hands-on real world work flow approach provides experience creating and manipulating both vector and raster data captured via satellite or areal platforms. Concepts of spatial analysis are presented through raster math and map algebra. Introductory students will work together to solve environmental problems through individual or group projects using UAS and satellite data.

## **GIS 225. GIS Project Development and Management**

Credits: 3

Prerequisite: GIS 105.

Typically Offered: SPRING

GIS 225 focuses on developing GIS project skills. Students gain experience in the definition, planning, execution, and completion of a geographic information systems project for one of several clients. Students also exercise technical skills, develop the ability to work in a team environment, and develop negotiating and project management skills.

## **GIS 235. Cartographic Design and Analysis**

Credits: 3

Prerequisite: GIS 105.

Typically Offered: FALL

The course incorporates the historical foundations of cartographic design and analysis with the digital age (GIS). Topics covered include the rapid changes in cartographic design driven by industry, data classification, advanced map design, generalization, multivariate mapping, and advanced thematic cartography through hands-on applications and case studies.

**GIS 240. GIS Capstone**

Credits: 3

Prerequisites: GIS 105, GIS 107 and GIS 201.

Typically Offered: SPRING

The course will demonstrate student knowledge and skills in geospatial technologies to a final GIS based project and presentation. Students will orally communicate results of a final professional level project. Projects will involve data collection and development, spatial analysis, cartographic design, digital image processing and other facets of project development and management of a large scale GIS project.

**GIS 250. PET Applications in GIS**

Credits: 1

Prerequisites: PET 115, GIS 105 and GIS 107.

Typically Offered: FALL

Geographic Information Systems (GIS) are widely used in the petroleum industry. This laboratory course will explore several key application categories that span the upstream to downstream aspects of the industry. The examples are created from real world projects and the data are either actual project data or are modified to preserve confidentiality. Emphasis is placed on understanding and visualizing petroleum data in the GIS environment. The course will integrate the knowledge acquired in the PET curriculum to analyze and interpret the GIS results.