

What is GIS?

GIS is a collection of computer hardware, software and geographical data for capturing, storing, managing, analyzing, and displaying all forms of geographically referenced information and associated attributes.

Who uses GIS?

GIS technology can be used for scientific investigations, resource management, asset management, urban planning, cartography, criminology, history, sales, marketing, and logistics.

Facilities

To support the course instruction and hands-on activities for the GIS certificate program, are three state-of-the-art fully equipped laboratories dedicated to remote sensing and GIS instruction and research. They include two indoor laboratories for data entry, analysis, visualization and display, and an outdoor laboratory for data gathering and monitoring local conditions. The laboratories are equipped with both computer hardware and software (ArcGIS, ArcView, ERDAS Imagine, ERMapper, and ENVI).

Cost

Each course costs \$495 with a 50% discount for full time students at Alabama A&M University.

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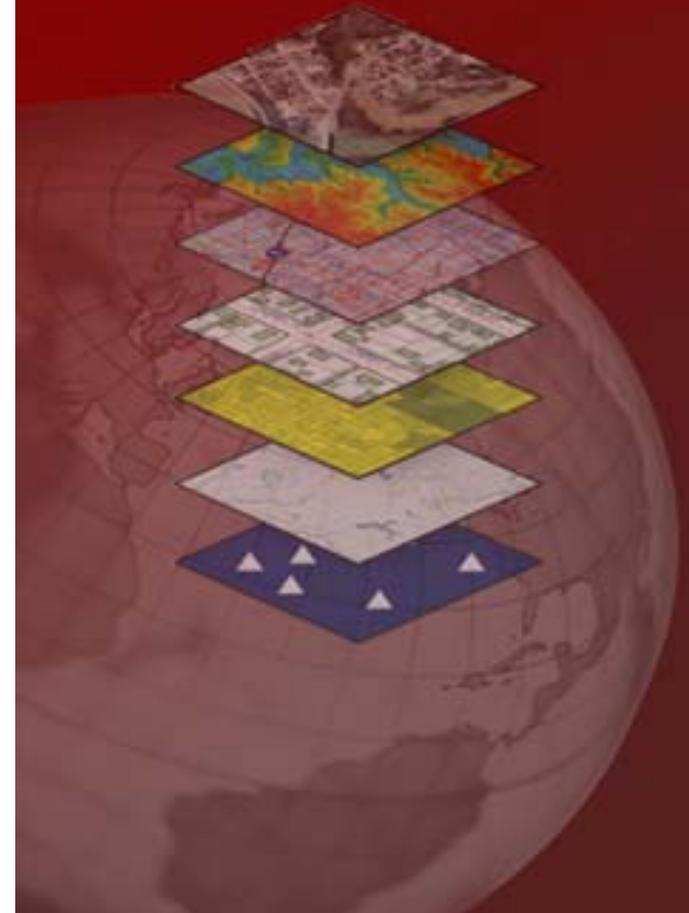
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Alabama A&M University

*Department of Natural Resources &
Environmental Sciences*

Certificate In

Geographic Information Systems



CERTIFICATE IN GEOGRAPHIC INFORMATION SYSTEMS

GIS Certificate Program

The GIS Certificate program is a Professional Development Certificate, not an academic degree; therefore, the courses carry CEUs. Each course is 1.6 CEU's (16 hours). Participants may complete the certificate program requirements and receive a certificate of completion, or attend just those classes that are of particular interest to them.

Candidates for certificate must pass each of the six core courses (9.6 CEUs), plus earn an additional 8.0 CEUs from the list of elective courses (for a total of 17.6 CEUs).

Class will be scheduled so that the program can be completed in one year.

Required Courses:

Introduction to GIS - an introduction to the fundamental concepts and applications of GIS. The basic GIS concepts such as map characteristics and projections, spatial data models, relational databases, and spatial analysis with emphasis on the nature and source of geographic data and the issues of data input, data quality and metadata will be covered.

Introduction to ArcGIS - provides the foundation for using ArcView, ArcEditor, or ArcInfo. Students will learn how to use ArcMap, ArcCatalog, and ArcToolbox and explore how these applications work together to provide a complete GIS software solution. The course covers fundamental GIS concepts as well as how to create, edit, and georeference spatial data.

GIS Data and Database Design - introduces relational and spatial data in GIS environment. The class will cover relational databases and geodatabase development, data quality and conversion, metadata management, data dictionaries and information system standards.

Spatial Analysis in GIS – focuses on principles and methods of spatial analysis and their application to different disciplines. Students will integrate geographic concepts and techniques used in spatial analysis, network analysis and 3D analysis with both raster and vector data structures.

Computer Cartography and Graphics Special Topics in GIS - covers the basic principles of cartography as well as modern techniques which have influenced map design, presentation, and interpretation processes. Students will develop a series of hard copy maps as well as design materials for presentation through digital mediums.

Special Topics in GIS - involves a special project developed by the student and the faculty member to demonstrate overall knowledge and capabilities. The course will be scheduled after completion of the first five core courses.

Elective Courses: (must complete five)

Introduction to GPS for GIS - explores methods for incorporating field research data in a GIS project.

Remote Sensing in GIS, Part 1 - provides basic concepts and procedures used in remote-sensed image processing. Emphasis is placed on use of digital satellite image data.

Remote Sensing in GIS, Part 2 - expands on the concepts and techniques presented in the preceding course. Students will be introduced to ERDAS Imagine software.

Raster GIS and Analysis - topics include the use of raster GIS tools for natural resource modeling and environmental analysis; the raster structure and its advantages and limitations; appropriate data and procedures; simple raster surface modeling and image

integration; map algebra concepts; proximity and dispersion modeling; and cost surfaces.

Spatial Analysis and Modeling - This course will focus on many of the vector-based analytical tools and techniques available within ArcGIS, as well as ways of linking external analytical tools (models, statistical programs) to ArcGIS.

GIS for Watershed Management – will apply GIS tools to problems of hillslope runoff and soil erosion prediction, interpretation of historical and current runoff-discharge relationships, and modeling the effects of changing land use.

Business Applications of GIS - examines the business and marketing applications of GIS such as proximity analysis, site location determination, and market delineation. Discusses where businesses find and how they create socioeconomic and demographic data, how data is integrated into GIS, and why it is important.

Spatial Statistics and Geostatistical Analysis – will introduce students to the concept of spatial transformations, as well as techniques for density analysis, spatial autocorrelation, interpolation, and kriging, by using the advanced techniques of ArcGIS extensions (Spatial, Geostatistical, and 3D Analyst).

Data Visualization in GIS – explores visualization of map and image-based scientific datasets, and subsequent interpretation based upon human visual/cognitive abilities. Topics covered include terrain analysis, landscape evolution, and change through time. ArcGIS 3D Analyst will be used to explore the possibilities of three dimensional data visualization.

Faculty and Staff:

This certificate program will be lead by Dr Wubishet Tadesse with support both professional and academic experts at Alabama A&M and the local GIS community.