University of Arkansas - Fort Smith
5210 Grand Avenue
P. O. Box 3649
Fort Smith, AR 72913-3649
479-788-7000

General Syllabus

GEOS 22203 Raster and 3D Spatial Analysis

Credit Hours: 3 Lecture Hours: 2 Lab Hours: 2

Prerequisite(s): GEOS 21203 GIS Geodatabase Design and GEOS 22003 Land Surveying and Information Fundamentals

Effective Catalog: 2021-2022

I. Course Information

A. Catalog Description

Examines the use of remotely sensed data in GIS analysis and presentation. Discussions focus on the electromagnetic spectrum and its characteristics, remote sensing platforms, sources of data and data interpretation. 3D spatial analysis covers the representation of data and spatial areas in three dimensions that can then be graphically analyzed and mapped.

B. Additional Information

Extend student's knowledge and skills in the area of remote sensing and raster analysis for use to address issues of relevance to local communities, the nation and the world. This course will provide a theoretical foundation upon which more advanced concepts can be learned. It will also provide students with basic applied skills using GIS remote sensing applications.

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Use concepts and terminology associated with remote sensing.
2. Illustrate appropriate uses of various analysis technology.
3. Prepare data associated with remote sensing concerning raster and 3D spatial acquisition.
4. Use the analytical functions of ArcGIS and digital image processing.
5. Design and develop maps and digital products resulting from image analysis techniques.

6. Examine three-dimensional visualization of GIS data for data exploration and synthesis.
7. Create and analyze surface data for sophisticated modeling, viewing, and analysis.

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Analytical Skills

Critical Thinking - Students will identify problems/issues and develop solutions/analysis for three-dimensional data.

Quantitative Reasoning - The student will develop spatial analysis and geo-referencing to apply appropriate solutions to outcomes.

Global and Cultural Perspectives

Students will demonstrate how their discipline impacts or is impacted by different global perspectives when creating and presenting data and information.

III. Major Course Topics

A. History of aerial photography and aerial platforms
B. Visual image interpretation and Photogrammetry
C. Multispectral and Thermal infrared remote sensing
D. Active & passive microwave remote sensing
E. LiDAR remote sensing data
F. Remote sensing of soils, vegetation, water, and urban landscape
G. Remote sensing of soils, minerals & geomorphology
H. Spectral reflectance measurement
I. Creation and analysis of three-dimensional views and data