South Central College

GIS 2845  Introduction to Remote Sensing

Common Course Outline

Course Information

Description  This course will introduce students to the basic concepts and fundamentals of remote sensing. Digital image processing techniques and aerial photo interpretation will be reviewed and applied to practical problems through the use of various lab activities. (Prerequisite: None)

Career Cluster  Engineering, Manufacturing & Technology

Total Credits  4.00
Total Hours  96.00

Types of Instruction

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<th>Instruction Type</th>
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<td>Lab</td>
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Pre/Corequisites

Prerequisite  None

Institutional Core Competencies

1. Analysis and inquiry: Students will demonstrate an ability to analyze information from multiple sources and to raise pertinent questions regarding that information.

2. Critical and creative thinking: Students will develop the disposition and skills to strategize, gather, organize, create, refine, analyze, and evaluate the credibility of relevant information and ideas.

Course Competencies

1. Discuss basic remote sensing theories.
   
   Learning Objectives
   Describe how remote sensing is applied in various professions.
   Differentiate between the various means of collecting remotely-sensed images.
   Explain the reasons for using both passive and active sensors for acquiring data.
   Describe the various methods for interpreting remotely-sensed data.

2. Examine how aerial photographs are acquired.
   
   Learning Objectives
Compare the components of analog aerial cameras to those of digital aerial cameras. Describe the basic geometry of a vertical aerial photograph. List the advantages and disadvantages of digital aerial photographs.

3 Utilize image interpretation techniques to obtain information about surface features.

   Learning Objectives
   Calculate photographic scale.
   Examine the distinguishable elements found in all aerial images.
   Discuss the use of stereo photos.
   Transfer remotely sensed data between multiple formats.

4 Examine the Electromagnetic Radiation Spectrum (EMR).

   Learning Objectives
   Identify the major divisions of the EMR spectrum.
   Identify the various ways in which EMR interacts with both the atmosphere and earth’s surface.
   Distinguish between objects that absorb and objects that reflect EMR.

5 Describe the major satellite imaging platforms and their instruments.

   Learning Objectives
   Describe why satellites take certain paths of orbit.
   Compare spatial and spectral resolutions between images.
   Identify the types of data provided by various satellites.
   Utilize data archives to research and download satellite images.

6 Manipulate digital images used in remote sensing.

   Learning Objectives
   Differentiate between raster file formats.
   Apply various band combinations to effectively display digital images.
   Apply image enhancement techniques to improve visual appearance of digital images.
   Identify software programs available for interpreting and manipulating data.

7 Acknowledge the importance of metadata.

   Learning Objectives
   Evaluate metadata software packages.
   Identify metadata key components.
   Determine metadata fields to data relationships.
   Develop image metadata.

8 Preprocess images.

   Learning Objectives
   Discuss atmospheric correction for imagery.
   Describe radiometric processing.
   Calculate radiances from digital numbers.
   Calculate top of atmosphere reflectance.
   Describe image data processing standards.

9 Perform image classifications.

   Learning Objectives
   Differentiate between informational and spectral classes.
   Perform unsupervised classifications.
   Perform supervised classifications.
   List the advantages, disadvantages, and limitations of classification methods.
   Develop an ideal sequence for selecting training data.

10 Perform change detection.

   Learning Objectives
   Describe the advantages and disadvantages of performing multitemporal change detection.
   Review the necessary preprocessing steps needed to perform change detection.
11 **Prepare for delivery of end data.**

Learning Objectives
Determine project deliverables.
Develop efficient work flow diagrams.
Adhere to project time lines.
Perform to highest quality of work standards.

12 **Describe end user requirements.**

Learning Objectives
Develop data for use in a GIS.
Provide efficient accessibility to data.
Research end user requirements.

13 **Identify how Remote Sensing is applied in various industries.**

Learning Objectives
Discuss remote sensing case studies.
Identify employment opportunities for Remote Sensing professionals.
Review industry data standards.

**SCC Accessibility Statement**

If you have a disability and need accommodations to participate in the course activities, please contact your instructor as soon as possible. This information will be made available in an alternative format, such as Braille, large print, or cassette tape, upon request. If you wish to contact the college ADA Coordinator, call that office at 507-389-7222.

Disabilities page [http://southcentral.edu/academic-policies/disability-rights.html](http://southcentral.edu/academic-policies/disability-rights.html)