ERSC304

Course Summary

Course : ERSC304 **Title :** Remote Sensing and GIS for Earth and Space Sciences
Length of Course : 8
Prerequisites :[leave blank] **CreditHours:**3

Description

Course Description:

This class introduces students to the fundamentals of remote sensing, geographic information systems (GIS), and associated geospatial technologies and techniques such as global positioning systems and image interpretation. It will provide an understanding of spatial data and its creation, manipulation, and analysis, through a combination of conceptual learning and hands-on exercises that focus on applications in earth and space studies.

Course Scope:

This course is intended for students in earth and space studies who will use the products of GIS and remote sensing in their work, and who may go on to work directly with these technologies.

Objectives

CO-1. Explain how spatial data is used to represent features on a planet's surface.

CO-2. Describe the different types of spatial data and their advantages and disadvantages.

CO-3. Summarize various methods of spatial data creation.

CO-4. Understand the basics of classifying and interpreting remotely sensed spatial data in an earth and space studies context.

CO-5. Use the components of a geographic information system.

CO-6. Apply different methods of spatial analysis appropriate for earth and space studies using a GIS.

Outline

Week 1: Introduction to Geospatial Technologies

Learning Objectives:
LO-1: Understand the history and scope of remote sensing.
LO-2: Describe the characteristics of electromagnetic radiation relevant to remote sensing.

Reading:
Cambpell and Wynne, Chapters 1 and 2

Assignment:
Week 1 Forum, Initial post by Wednesday, 11:59 PM Eastern Time, peer replies by Sunday, 11:59 PM Eastern Time

Week 2: Imagery Basics and GPS

Learning Objectives:
LO-1: Understand how aerial photos and digital images are used to capture Earth features.
LO-2: Describe how GPS can be used to create spatial data

Reading:
Cambpell and Wynne, Chapters 3 and 4

Assignment:

Week 2 Forum, Initial post by Wednesday, 11:59 PM Eastern Time, peer replies by Sunday, 11:59 PM Eastern Time

Week 3: Image Interpretation and Land Observing Satellites

Learning Objectives:
LO-1. Apply the elements of image interpretation to aerial photography.
LO-2. Understand the importance and uses of the Landsat series of satellites and other land observing satellites.

Reading:
Cambpell and Wynne, Chapters 5 and 6

Assignments:
Week 3: Photointerpretation, due Sunday, 11:59 PM Eastern Time
Week 3 Forum, Initial post by Wednesday, 11:59 PM Eastern Time, peer replies by Sunday, 11:59 PM Eastern Time

Week 4: Image Classification and Applications

Learning Objectives:
LO-1. Differentiate between unsupervised and supervised classification.
LO-2. Identify specific Earth science applications of remote sensing.

Reading:
Cambpell and Wynne, Chapters 10, 12 and 18

Assignments:
Week 4: Midterm Assessment, due Sunday, 11:59 PM Eastern Time
Week 4 Forum, Initial post by Wednesday, 11:59 PM Eastern Time, peer replies by Sunday, 11:59 PM Eastern Time

Week 5: Introduction to GIS

Learning Objectives:
LO-1. Describe the basic components of a geographic information system.
LO-2. Demonstrate basic familiarity with the use of geographic information systems.

Reading:
GIS Commons, Chapters 1 and 6

Assignments:
Week 5: Intro to GIS, due Sunday 11:59 PM Eastern Time
Week 5 Forum, Initial post by Wednesday, 11:59 PM Eastern Time, peer replies by Sunday, 11:59 PM Eastern Time

Week 6: Vector Data

Learning Objectives:
LO-1. Understand the process of vector data creation.
LO-2. Use the components of a geographic information system to manipulate vector data.

Reading:
GIS Commons, Chapter 2

Assignments:
Week 6: Mapping and Creating Vector Data, due Sunday 11:59 PM Eastern Time
Week 6 Forum, Initial post by Wednesday, 11:59 PM Eastern Time, peer replies by Sunday, 11:59 PM Eastern Time

Week 7: Map Processing and Raster Data

Learning Objectives:
LO-1. Understand the ways in which spatial and attribute data may need to be processed before use.
LO-2. Use the components of a geographic information system to manipulate raster data.

Reading:
GIS Commons, Chapters 3 and 4

Assignments:
Week 7: Vector Analysis, due Sunday 11:59 PM Eastern Time
Week 7 Forum, Initial post by Wednesday, 11:59 PM Eastern Time, peer replies by Sunday, 11:59 PM Eastern Time

Week 8: Raster and Vector Together

Learning Objectives:
LO-1. Use the components of a geographic information system to manipulate vector and raster data together.
LO-2. Understand how use GIS to conduct spatial analysis on raster and vector data.

Reading:
GIS Commons, Chapter 5

Assignments:
Week 8: Raster and Vector, Together, due Sunday 11:59 PM Eastern Time
Final Project, due Sunday 11:59 PM Eastern Time
Week 8Forum, Initial post by Wednesday, 11:59 PM Eastern Time, peer replies by Sunday, 11:59 PM Eastern Time

Evaluation

Discussions Assignments:

Discussion Week #1 is MANDATORY for all students and late assignments cannot be accepted. This is a requirement for all courses at APUS and no exceptions can be made.

We can learn as much from each other and academic investigation as we will from the material. It is the purpose of the Discussions to develop our understanding of the weekly readings and discussion topics. This participation is required. Each week all students should respond to the discussion topics indicated in the Discussions area to express their understanding of the issue and ability to research academic information to add to the discussion.

Students are expected to provide a substantial comment of several well-written paragraphs in each session and a similar comment or reflection in reply to at least two other students' contribution. Statements such as "I agree" or "good post" will not count as a reply. Please be familiar with the University's policy on plagiarism and academic honesty as well. While formal academic citations are not required in discussion posts, links to sources used should be provided. After the first week, initial posts are due on Wednesday of the assigned week and all responses must be complete by Sunday of the assigned week.

Assignments:

The assignments include five relatively short hands-on GIS and photointerpretation assignments, and a more detailed midterm remote sensing knowledge review and final project. Details about these assignments can be found in the Assignments section.

Discussions	20%
Assignments	50%
Midterm Assessment	15%
Final Project	15%

Materials

Book Title: Introduction to Remote Sensing, Fifth Edition
Author: James B. Campbell and Randolph H. Wynne
Publication Info: Guildford Press
ISBN: 978-1-60918-176-5
Available from the Trefry Library

GIS Commons
Michael Schmandt
https://giscommons.org/

Course Guidelines

Citation and Reference Style

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Tutoring

- Tutor.com offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

Late Assignments

- Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. The due date for each assignment is listed under each
- Assignment.
  Generally speaking, late work may result in a deduction up to 10% of the grade for each day late, up to a
- maximum of 50%.

Faculty may be more flexible if they know ahead of time of any potential late assignments.

Turn It In

- Faculty may require assignments be submitted to Turnitin.com. Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

Academic Dishonesty

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services such as CourseHero.com. Additionally, allowing your work to be placed on such web services is academic dishonesty, as it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

Submission Guidelines

- Some assignments may have very specific requirements for formatting (such as font, margins, etc) and submission file type (such as .docx, .pdf, etc) See the assignment instructions for details. In general, standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

Disclaimer Statement

- Course content may vary from the outline to meet the needs of this particular group.

Communicating on the Discussion

- Discussions are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the discussion. The purpose of the discussions is to actively participate in an on-going discussion about the assigned content.
- “Substantive” means comments that contribute something new and hopefully important to the discussion. Thus a message that simply says “I agree” is not substantive. A substantive comment contributes a new

idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

Identity Verification & Live Proctoring

- Faculty may require students to provide proof of identity when submitting assignments or completing assessments in this course. Verification may be in the form of a photograph and/or video of the student's face together with a valid photo ID, depending on the assignment format.
- Faculty may require live proctoring when completing assessments in this course. Proctoring may include identity verification and continuous monitoring of the student by webcam and microphone during testing.

University Policies

Student Handbook

- Drop/Withdrawal policy
- Extension Requests
- Academic Probation
- Appeals
- Disability Accommodations

The mission of American Public University System is to provide high quality higher education with emphasis on educating the nation's military and public service communities by offering respected, relevant, accessible, affordable, and student-focused online programs that prepare students for service and leadership in a diverse, global society.