EVSP322

Course Summary

Course : EVSP322 **Title :** Remote Sensing and Geographic Information Systems
Length of Course : 8
Prerequisites : N/A **Credit Hours :** 3

Description

Course Description: This course illustrates the fundamental concepts of GIS and remote sensing technologies in the context of land use planning and management. Topics include the physical basis for remote sensing, remote sensing systems, digital image processing, data structures, database design, and spatial data analysis. The course is not intended to provide students with extensive training in particular image processing or GIS packages; however course exercises and the final project will require GIS data analysis and presentation skills.

Course Scope:

This course provides an introduction to the use and technology in remote sensing and geographic information systems.

Objectives

After successfully completing this course, you will be able to:

- LO-1 Detail the history of modern remote sensing use and technology.
- LO-2 Describe how fine spatial information is collected and analyzed using field surveys, remote sensing, GIS and GPS technology.
- LO-3 Interpret air photos and images.
- LO-4 Explain the application and uses of remote sensing technologies, including satellite imagery, active microwave remote sensing, Lidar, hyperspectral and thermal remote sensing.
- LO-5 Apply remote sensing technology and data analysis to complex problems in environmental management and land use planning.

Outline

Week 1: Foundations

Learning Objectives

LO-1 Detail the history of modern remote sensing use and technology

Readings

Campbell & Wynne (2011)

Ch 1 – History and Scope of Remote Sensing

Ch 2 – Electromagnetic Radiation

Assignments

Forum 1

Week 2: Image Acquisition Part I

Learning Objectives

LO-2 Describe how fine spatial information is collected and analyzed using field surveys, remote sensing, GIS and GPS technology

LO-3 Interpret air photos and images.

Readings

Campbell & Wynne (2011)

Ch 3 – Mapping Cameras

Ch 4 – Digital Imagery

Ch 5 – Image Interpretation

Assignments

Forum 2

HW-A

Week 3: Image Acquisition Part II

Learning Objectives

LO-3 Interpret air photos and images.

LO-4 Explain the application and uses of remote sensing technologies, including satellite imagery, active microwave remote sensing, Lidar, hyperspectral and thermal remote sensing

Readings

Campbell & Wynne (2011)

Ch 6 – Land Observation Satellites

Ch 7 – Active Microwave

Ch 8 – Lidar

Evans (2004) Active microwave remote sensing

Assignments

Forum 3

HW-B

Week 4: Image Acquisition Part III

Learning Objectives

LO-1 Detail the history of modern remote sensing use and technology

LO-2 Describe how fine spatial information is collected and analyzed using field surveys, remote sensing, GIS and GPS technology

LO-4 Explain the application and uses of remote sensing technologies, including satellite imagery, active microwave remote sensing, Lidar, hyperspectral and thermal remote sensing

Readings

Campbell & Wynne (2011)

Ch 9 – Thermal Imagery

Ch 10 – Image Resolution

Assignments

Forum 4

Assessment 1

Week 5: Analysis Part I

Learning Objectives

LO-2 Describe how fine spatial information is collected and analyzed using field surveys, remote sensing, GIS and GPS technology

LO-3 Interpret air photos and images.

LO-5 Apply remote sensing technology and data analysis to complex problems in environmental management and land use planning

Readings

Campbell & Wynne (2011)

Ch 11 - Preprocessing

Ch 12 – Image Classification

Assignments

Forum 5

HW-C

Week 6: Analysis Part II

Learning Objectives

LO-5 Apply remote sensing technology and data analysis to complex problems in environmental management and land use planning

Readings

Campbell & Wynne (2011)

Ch 13 – Field Data

Ch 14 – Accuracy Assessment

Ch 15 – Hyperspectral Remote Sensing

Assignments

Forum 6

HW-D

Week 7: Applications Part I

Learning Objectives

LO-2 Describe how fine spatial information is collected and analyzed using field surveys, remote sensing, GIS and GPS technology

LO-4 Explain the application and uses of remote sensing technologies, including satellite imagery, active microwave remote sensing, Lidar, hyperspectral and thermal remote sensing

LO-5 Apply remote sensing technology and data analysis to complex problems in environmental management and land use planning

Readings

Campbell & Wynne (2011)

Ch 16 – Change Detection

Ch 20 – Land Use and Land Cover

Assignments

Forum 7

Assessment 2

Week 8: Applications Part II

Learning Objectives

LO-3 Interpret air photos and images.

LO-5 Apply remote sensing technology and data analysis to complex problems in environmental management and land use planning

Readings

Campbell & Wynne (2011)

Ch 19 – Hydrospheric Sciences

Ch 21 – Global Remote Sensing

Conclusion

Assignments

Forum 8

Course Project

Evaluation

Grading:

Name	Grade %
Forums	24.00 %
Week 1	3.00 %
Week 2	3.00 %
Week 3	3.00 %
Week 4	3.00 %
Week 5	3.00 %
Week 6	3.00 %
Week 7	3.00 %
Week 8	3.00 %
Assessments	20.00 %
Assessment 1	10.00 %
Assessment 2	10.00 %
Homework	32.00 %
HW-A	8.00 %
HW-B	8.00 %
HW-C	8.00 %
HW-D	8.00 %
Course Project	24.00 %
Course Project	24.00 %

Materials

Book Title: Introduction to Remote Sensing, 5th ed.-E-book available in the APUS Online Library

Author: Campbell, James B

Publication Info: Guilford Press

ISBN: 9781609181765

Book Title: To find the library e-book(s) req'd for your course, please visit http://apus.libguides.com/er.php to locate the eReserve by course #. You must be logged in to eCampus first to access the links.

Author: N/A

Publication Info: N/A

ISBN: N/A

Required Readings:

Evans, D.D. (2004) Active microwave remote sensing. *Crosslink*, 5(2): 20-26

Current issue of the academic journal *Remote Sensing of Environment*, available through the APUS online library.

Additional Resources: Please go to the program guides in the APUS Library for additional resources:

- Environmental Science: http://apus.libguides.com/environmental_science

Software Requirements

- Microsoft Office (MS Word, MS Excel, MS PowerPoint) - American Public University System provides Microsoft Office 365 to AMU/APU students and faculty at no cost
- Adobe Acrobat Reader

Web Sites

In addition to the required course texts, the following public domain web sites are useful. Please abide by the University academic honesty policy when using Internet sources as well. Note web site addresses are subject to change.

Earthshots: Satellite Images of Environmental Change: http://earthshots.usgs.gov/tableofcontents

European Space Agency: http://www.esa.int/esaCP/index.html

Florida Department of Environmental Protection: http://www.dep.state.fl.us/mainpage/default.htm

GIS at Indiana University: http://www.indiana.edu/~gis/

Global Visualization Viewer (GLOVIS): http://glovis.usgs.gov/

Google Earth: http://www.google.com/earth/index.html

The Landsat Program: http://landsat.gsfc.nasa.gov/

Lidar In-space Technology Experiment (LITE): http://www-lite.larc.nasa.gov/

MODIS Web: http://modis.gsfc.nasa.gov/data/

National Aeronautics and Space Administration: http://www.nasa.gov/

National Snow & Ice Data Center: https://nsidc.org/

National Wetlands Inventory: http://www.fws.gov/wetlands/index.html

The Online Guides – Remote Sensing – University of Illinois: http://ww2010.atmos.uiuc.edu/%28Gh%29/guides/rs/home.rxml

RADARSAT-2 Canadian Space Agency: http://www.asc-csa.gc.ca/eng/satellites/radarsat2/default.asp

Remote Sensing Data and Information: http://rsd.gsfc.nasa.gov/rsd/RemoteSensing.html

TerraServer: http://www.terraserver.com/

The Weather Channel: http://www.weather.com/

Weather Underground: http://www.wunderground.com/

Wetlands Mapper: http://www.fws.gov/wetlands/Data/Mapper.html

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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 15% of the grade for each day late, not to exceed 5 days.
- As a working adult I know your time is limited and often out of your control. 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 Forum

- Forums 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 forum. The purpose of the forums 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.

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.