

Syllabus: EES212 – Geospatial Technologies

CALIFORNIA STATE UNIVERSITY, FRESNO
Geospatial Technologies
Academic Department Office Location:
Science II, Room 121
Department of Earth and Environmental Sciences
Fax: (559) 278-5980

Course Information	Instructor Information
Course No: EES212	Instructor: Xiaoming Yang, PhD
Units: 3	Email: xmyang@csufresno.edu
Prerequisite: None	Online Office Hours Mon. & Wed. 9-11:3am

Basic Course Information:

This is a 3-unit online course to be learned at any time during the offering period. The course materials are available through Blackboard (login using your CSUF e-mail passwords)

Information for the entire class will be posted on announcements weekly, or more often if necessary. For personal questions, students may email the instructor directly. When writing an E-mail to the instructor, be sure to write "EES212-LastName-Initial and question, otherwise the email will be deleted as junk mail.

Response Times: The instructor will check and respond to email and the discussion board at least 2 days a week. Assignments will be graded, posted in the grade book and returned within the week of the due date.

Online office hours may be accessed from course menu in Blackboard.

Catalog Description:

EES 212: Geospatial Technologies

Prerequisites: None. The course introduces global positioning systems, remote sensing, and light detection and ranging technology and their integration with Geographic Information Systems. Asynchronous online.

Course Goals:

The goals of this course are to:

- Provide knowledge about the fundamentals of remote sensing, sensor systems and image characteristics
- Provide knowledge about the GPS system and its components, the GPS signal structure, the types of GPS measurements and their errors and biases

Syllabus: EES212 – Geospatial Technologies

- Provide an introduction to LIDAR data and discusses how to integrate and manage LIDAR data in GIS
- Enhance student understanding of characteristics of spatial data that come from different sources
- Enhance student understanding of data quality issues when integrating different data sources in GIS.

Student Learning Outcomes:

Upon successful completion of the class, students should be able to:

- Critically evaluate and analyze data quality for their GIS project
- Design a geo-database and defend the data type selection
- Appraise the degree to which remote sensing data can be used efficiently and effectively
- Interpret the GPS signal and the factors that affect signal quality
- Interpret the significance of Dilution of Precision and its effect on position accuracies and evaluate correction techniques
- Decide and defend the use of raster versus terrain when performing analysis with LIDAR data
- Combine LIDAR data with multiple data sources to create more complex three-dimensional surfaces

Textbooks:

Ahmed El-Rabbany; Introduction to GPS: The Global Positioning System, Second Edition; published by Artech House; ISBN 978-1-59693-017-9

David L Verbyla; Satellite Remote Sensing of Natural Resources; Published by CRC Press; ISBN 1-55670-107-4

Assignments:

There are three (3) ESRI web courses to be completed and two (2) ESRI training seminars to be attended. The web courses must be completed by the due date. A report on what have you learned from the seminar must be submitted after finishing the training seminar and submitted by the due date. Late completion of assignments will result in reduction of the grade by 10% per day for the first five days and will result no credit after the fifth day.

The report on the GPS seminar should focus on

- Why GPS is critical to GIS
- Differential correction and GPS data accuracy
- Considerations in selecting GPS device for GIS applications

The report on the imagery seminar should focus on

- Elements of image interpretation

Syllabus: EES212 – Geospatial Technologies

Required Materials - Hardware and Software Requirements, Cost

Each student must have access to a computer with a DVD drive and capable of running MS Windows-based software. The student bears the cost of hardware and Internet access. The minimum system requirements are:

- Operating system: Windows 2000 professional or higher
- CPU Speed: 1.6 GHz or higher
- Memory (RAM): 1 GB
- Free Disk Space: 5 GB
- Broadband Internet access
- ArcGIS Desktop software, including the Spatial Analyst, 3D Analyst, Network Analyst, and Geostatistical Analyst extensions, will be provided at no cost to students. The software was supplied to students at the beginning of EES 211.

Evaluation Procedures:

- Grading:
 - Four quizzes: 60%
 - GPS training seminar report 10%
 - Visualizing and Analyzing Imagery seminar report 10%
 - Working with Raster exercise 10%
 - Using LIDAR Data exercise 10%
- Grading scales:
 - 90-100% = A
 - 80-89% = B
 - 70-79% = C
 - 60-69% = D
 - Under 60% = F

Grading Rubric for Training Seminar Reports:

- Each report is graded based on the following criteria:

Criteria	3	2	1
Introduction	Presents a concise lead-in to the report	Gives very little information or too much information-- more like a summary	Does not give any information about what to expect in the report
Research	Focus on the topics and includes many other interesting facts	Focus on some topics and includes a few other interesting facts	Does not focus on the topics
Conclusion	Presents a logical explanation for findings and addresses most of the topics	Presents a logical explanation for findings and addresses some of the topics.	Presents an illogical explanation for findings and does not address any of the topics

Syllabus: EES212 – Geospatial Technologies

Criteria	3	2	1
Grammar & Spelling	All grammar and spelling are correct	Only one or two errors	Very frequent grammar and/or spelling errors
Timelines	Report handed in on time	10% reduction per day	10% reduction per day

- Total points are summary of each criterion.

Grading Rubric for web courses:

- Each web course is graded out of 5 points.
- 5-Completed web course and greater than 95% correct on the course evaluation
- 4- Completed web course and 90% to 94% correct on the course evaluation
- 3- Completed web course and 85% to 89% correct on the course evaluation
- 2- Completed web course and 80% to 84% correct on the course evaluation
- 1-Completed web course and <80% correct on the course evaluation
- 0-Incomplete web course

Expectations:

Communications: The course is an online class; therefore, most of our interactions will be asynchronous. Three ESRI training courses and two seminars will be assigned in the class. ESRI classes are graded by the above criteria; a report (2 to 4 pages; double spaced; 12 pt font; 1" margins) is required for the two of the ESRI Training Seminars. The report must be submitted to the instructor via the Blackboard Assignment link.

Workload: Students should expect to spend 10-12 hours per week completing the work in this course.

Resources:

This course will be presented through Blackboard where all course materials and online discussions will be hosted. The primary resource for the course is the textbook. The following link is provided for extra readings:

[Aerial Photography and Remote Sensing webpage](http://www.colorado.edu/geography/gcraft/notes/remote/remote_f.html)

(http://www.colorado.edu/geography/gcraft/notes/remote/remote_f.html) - RS

[Remote Sensing Tutorial webpage](http://www.fas.org/irp/imint/docs/rst/Front/tofc.html) (<http://www.fas.org/irp/imint/docs/rst/Front/tofc.html>) - RS

[U.S. Government Global Positioning System webpage](http://www.gps.gov/) (<http://www.gps.gov/>) - GPS

[GPS Errors & Estimating Your Receiver's Accuracy webpage](http://edu-observatory.org/gps/gps_accuracy.html) (http://edu-observatory.org/gps/gps_accuracy.html) - GPS

UNIVERSITY POLICIES:

Students with Disabilities:

Syllabus: EES212 – Geospatial Technologies

Upon identifying themselves to the instructor and the university, students with disabilities will receive reasonable accommodation for learning and evaluation. For more information, contact Services to Students with Disabilities in the University Center Room 5 (278-2811).

Honor Code:

“Members of the CSU Fresno academic community adhere to principles of academic integrity and mutual respect while engaged in university work and related activities.” You should:

- a. understand or seek clarification about expectations for academic integrity in this course (including no cheating, plagiarism and inappropriate collaboration)
- b. neither give nor receive unauthorized aid on examinations or other course work that is used by the instructor as the basis of grading.
- c. take responsibility to monitor academic dishonesty in any form and to report it to the instructor or other appropriate official for action.

Instructors may require students to sign a statement at the end of all exams and assignments that “I have done my own work and have neither given nor received unauthorized assistance on this work.” If you are going to use this statement, include it here.

Cheating and Plagiarism:

"Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another student to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term 'cheating' not be limited to examination situations only, but that it include any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means. Plagiarism is a specific form of cheating which consists of the misuse of the published and/or unpublished works of others by misrepresenting the material (i.e., their intellectual property) so used as one's own work." Penalties for cheating and plagiarism range from a 0 or F on a particular assignment, through an F for the course, to expulsion from the university. For more information on the University's policy regarding cheating and plagiarism, refer to the Class Schedule (Legal Notices on Cheating and Plagiarism) or the University Catalog (Policies and Regulations).

Computers:

"At California State University, Fresno, computers and communications links to remote resources are recognized as being integral to the education and research experience. Every student is required to have his/her own computer or have other personal access to a workstation (including a modem and a printer) with all the recommended software. The minimum and recommended standards for the workstations and software, which may vary by academic major, are updated periodically and are available from Information Technology

Syllabus: EES212 – Geospatial Technologies

Services (<http://www.csufresno.edu/ITS/>) or the University Bookstore. In the curriculum and class assignments, students are presumed to have 24-hour access to a computer workstation and the necessary communication links to the University's information resources."

Disruptive Classroom Behavior:

"The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. ... Differences of viewpoint or concerns should be expressed in terms which are supportive of the learning process, creating an environment in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop and understanding of the community in which they live . . . Student conduct which disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from class."

Copyright policy:

Copyright laws and fair use policies protect the rights of those who have produced the material. The copy in this course has been provided for private study, scholarship, or research. Other uses may require permission from the copyright holder. The user of this work is responsible for adhering to copyright law of the U.S. (Title 17, U.S. Code). To help you familiarize yourself with copyright and fair use policies, the University encourages you to visit its copyright web page:

<http://www.csufresno.edu/library/libraryinformation/campus/copyright/copyrtpolicyfull.pdf>

For copyright Questions & Answers:

<http://www.csufresno.edu/library/libraryinformation/campus/copyright/faqcopyright.pdf>

Tentative Course Schedule:

Week	Topic	Reading Assignment	Assignment/Quiz/Test
1	Introduction	Chapter 1	
2	GPS Details	Chapter 2	
3	GPS Satellite Orbit/ GPS Errors and Biases	Chapter 3 & 4	Quiz 1
4	GPS Positioning Modes	Chapter 5	
5	GPS Data and Correction Services/ GPS Stand Format	Chapter 7 & 8	
6	GPS Integration with GIS	Chapter 9.1	GPS training seminar – report due on Wednesday of week seven
7	Satellite Image and Image Processing Systems	Chapter 1 & Chapter 2	Quiz 2

Syllabus: EES212 – Geospatial Technologies

Week	Topic	Reading Assignment	Assignment/Quiz/Test
8	Spectral Regions	Chapter 3	Visualizing and Analyzing Imagery seminar – report due on Friday of week nine
9	Radiometric Corrections & Geometric Corrections	Chapter 4 & 5	Quiz 3
10	Unsupervised Classification & Supervised Classification	Chapter 6 & 7	Working with Raster exercise
11	Classification Accuracy Assessment	Chapter 8	Quiz 4
12	Using LIDAR Data	Getting Started with LIDAR	Using LIDAR Data exercise

This syllabus and schedule are subject to change. Adequate notice will be given to students. It is your responsibility to check Blackboard announcements to obtain this information.