

AGET 340 Course Syllabus

Course Description: Application of Global Positioning Systems (GPS) and Geographic Information Systems (GIS) in agriculture and natural resource management. Identification and delineation of locations and areas; collection, analysis, storage, and retrieval of site and time specific data for agriculture and natural resource management and monitoring. 2.0 hours lecture, 3.0 hours laboratory

Instructor: Michael Spiess

Office Hours and Contact Information: Monday-Thursday 1000-1050 in Plumas 213, Tuesday 1300-1350 in Shop II.

E-mail: mspiess@csuchico.edu.

Web site: <http://www.agedweb.org>

Phone: 898-4554.

Note: Email is a good way to contact the instructor outside of class or office hours. Emails are generally answered within 12 hours or less. However some student messages may be trapped by the campus spam filter. To reduce your chances of having your message blocked always include a subject line, don't add links to the message, and don't type in all caps.

Class Meeting: Tuesday and Thursday 800-850 at Plumas 303, Lab Thursday 1400-1650 in Plumas 321 or ARTC (Farm) Shop II.

Course Objectives: Students will:

- Have an understanding of GPS operation, types of GPS, and the use of GPS for spatial location of data.
- Be able to describe components of a GIS; appropriate applications and limitations of spatial data and analyses; essential elements of metadata.
- Be able to describe various GIS agriculture industry applications and expected future improvements/innovations.
- Have an understanding of common types of data collection equipment used in precision agriculture.
- Have an understanding of the principles of operation of data collection equipment used in precision agriculture.
- Understand the role of remote sensing in precision agriculture.
- Gain an understanding of yield monitor development and the different measurement techniques.
- Gain an understanding of VRT development and applications of this technology in agriculture.
- Demonstrate spatial data presentation (ex. maps) using data collected in the field.
- Acquire, import, edit and export digital data; including historical and real-time data appropriate for use in agriculture and NR management.
- Be able to design a simple GIS database and use GIS tools to process datasets.
- Create a precision agriculture project: determine data types and sources required to answer crop and soil management questions.
- Be able to define, create, and analyze different types of surfaces using a variety of methods; critique the various methods.
- Compare different types of agricultural data using normalization and reclassification methods; explore correlation relationships.
- Use overlay, query and distance operations to find relationships within and between data sets
- Create maps and charts to visualize, interpret and present the analysis results.
- Apply spatial analysis methods to data used in the course to address management issues in found various types of agriculture.
- Examine the spatial variability in important cropping attributes.
- Gain an understanding of soil sampling scheme design options for Precision Agriculture for establishing experiments and assessing causal factors of yield variation.

The course includes the study and practice of the following skills:

- Field use of spatial data collection equipment commonly used in Ag and NR management.
- Basic GIS skills with ArcGIS
- Basic GIS analysis skills commonly used in Ag and NR management.

Required Equipment/supplies:

- Students will need a USB drive with at least 128 MB of free space.
- Students will need to print during lab.

Required Texts: Precision Ag by Terry Braze. Other required readings will be available online.

Web Site and Computer Use:

Computers are an integral part of agricultural mechanics industry and students are expected to use this technology as part of the course. Some materials for this course are found on the course web site delivered by WebCT. These materials are an integral part of the course and students will be expected to review it regularly. Written assignments are expected to be typed. Generally, assignments will be provided in MS-Word format allowing the student to print and edit the document. Students not familiar with computers or use of the Web (or WebCT) are strongly encouraged to seek training (see instructor for further information). Computer portions of this course can be completed on a home computer with an internet connection or in a campus computer lab (see <http://www.csuchico.edu/stcp/labs/>). Information on other computer resources for students is available at: <http://www.csuchico.edu/stcp/>

On the web site students will find:

- Lecture Notes (in PPT) provided as a study aid only.
- Lab Exercises
- Grades (generally posted after the 4th week)
- Assignments
- A current course activity schedule (in syllabus)
- Other resources and required reading.

Course Management:

- Students are strongly advised not to miss labs since this time may be difficult or impossible to make up.
- No makeup of test, quizzes, etc. will be allowed unless by prior permission of the instructor.
- No written assignments will be accepted after the last lecture meeting. Late assignments are subject to a 20% penalty. No lab projects will be accepted after the Final Exam.
- Tests will be a combination of multiple choice, short answer, and problems.
- **Lab projects are due in the following lab.**
- Student grades will be posted on WebCT web site and it is the responsibility of the student to check their grade for accuracy. If a student feels an error in grading has been made, the student has one week from the time of the assignment is returned to them (or the grade is posted on the web, whichever is later) to request a review of the grade. The request must be in writing – attached to the original assignment—and must include a specific statement as to what is in error, how it should be corrected, and what supporting evidence is available. It is highly recommend that students keep copies of assignments.
- It is the student's responsibility to meet all appropriate deadlines for adding, withdrawing, etc. These deadlines can be found on the University web site at: <http://www.csuchico.edu/schedule/>
- Use of tobacco products is not allowed during class.

- Students are expected to turn off all pagers, cell phones and other electronic devices during class time. Use of cell phones, pagers, and similar electronic devices during class are disruptive to the class and prohibited.
- Students are expected to pay attention and participate in class meetings.
- All class participants are expected to exhibit respectful behavior to other students and the instructor.
- All students have the right and privilege to learn in the class, free from harassment and disruption.
- Inappropriate or disruptive behavior will not be tolerated, nor will lewd or foul language.
- The class follows the standards set in the **Code of Students Rights and Responsibilities (EM 96-38)** and students are subject to disciplinary action for violation of that code.

Grading:

Grades will be determined by:

	Approximate Points
Written assignments	100-150
Midterm	100
Quizzes (0-4)	100
Paper Review/Presentation	125
1 final exam (comprehensive)	150
Lab exercises	750

Grades will be assigned using the following scale:

94% - 100%	A
90% - 92%	A-
87% - 89%	B+
83% - 86%	B
80% - 82%	B-
77% - 79%	C+
73% - 76%	C
70% - 72%	C-
67% - 69%	D+
63% - 66%	D
60% - 62%	D-
Below 60%	Failure

University Policies

University policies will be enforced in the course (see Catalog).

Cheating and Plagiarism: Cheating and plagiarism are considered as the most serious offenses in the teaching-learning process, as it erodes the integrity of the student/faculty relationship. Students are reminded that the University Policy on Academic Honesty will be enforced in this class. The policy is available in the Catalog. *Students are reminded that turning in someone else's homework or project is considered cheating.* If there is evidence that you have been involved in any form of academic dishonesty, you will receive an "F" grade for the course, be locked from WebCT, and a report will be provided to Student Judicial Affairs for further action.

Students with Disabilities: Upon identifying themselves to the instructor and the university, students with disabilities will receive reasonable accommodation for learning and evaluation. (Contact Disability Support Services)

Academic Rigor

Academic rigor means the consistent expectation of excellence and the aspiration to significant achievement. It should pervade the entire atmosphere of the University--teaching and learning, curriculum, evaluation of student and faculty, outreach, admissions, advising, and student life.

Rigorous Learning

Rigorous students are part of the equation of rigorous teaching and learning. A rigorous education is vigorous, difficult, deeply satisfying work, and it requires a lifestyle conducive to achieving excellence. College is not a temporary diversion or a period of entertainment, but a fundamental piece of student character, citizenship, and employment future. A diploma and good grades from a demanding institution count for something. Rigorous students

- Set high personal standards, develop a strong sense of purpose, come to class well-prepared, and complete assignments on time.
- Develop an effective relationship with the instructor, in and outside of class, and make the most of University advising and other services.
- Treat fellow students and the classroom environment with complete respect. Give each class full attention and participation. Do not miss class, arrive late, or leave early.
- Accept continuing responsibility for learning and for grades earned.
- Approach each class in a professional manner, as if the class were real employment. Treat a full-course load as full-time work and spend no less time on it. Determine exactly what is expected.
- Experiment with all teaching and learning strategies used in classes, and also determine which work best for them.
- Demonstrate complete honesty and integrity.

Rigorous Teaching

Rigorous faculty are role models for the behaviors and accomplishments the University seeks to promote. They demonstrate a high level of professionalism and commitment to the University and to their discipline and inspire in students an excitement about learning. Guiding students toward excellence, they

- Communicate high expectations and demonstrate them through a demanding syllabus and well-prepared classes.
- Encourage student-faculty contact in and out of class and offer conscientious advising and consistent availability.
- Encourage collaboration and active learning, fully involving students in the learning experience.
- Provide students early, prompt, and frequent feedback and develop appropriate assessment strategies.
- Emphasize time on task, clearly communicate time required for learning, make it clear that full-time study is full-time work, and design learning experiences so that homework matters.
- Develop approaches and strategies geared to diverse talents and ways of learning, while maintaining high standards of accountability.
- Reduce opportunities to engage in academic dishonesty and challenge its occurrence.

Course Schedule

		Reading*	
Week	Topic	Reading	Lab
8/21/2006	Introduction to Spatial Technologies for Ag and N/R Management	Chap #1	Intro to GPS (Farm)
8/28/2006	GPS Technology	See WebCT	HGIS, GPS Accuracy (farm)
9/4/2006	GIS Basics	Chap# 2	GPS Boundary Mapping (HGIS)
9/11/2006	Map Principles	Chap #3	Intro to GIS, Mapping GPS data
9/18/2006	Statistics used in Precision Ag	Chap #4	Soil Data Collection (Farm)
9/25/2006	Data Structures in GIS and PA	Chap #5	GIS Layers
10/2/2006	GIS Analysis	Chap #6	Maps, scale, legends, etc.
10/9/2006	Interpretive Techniques	Chap #7	Variable Rate Technologies (prescription maps and as applied maps) (Farm) (Yield Monitor Hardware)
10/16/2006	Maps	Chap #8	Yield Monitor Data Collection and Processing
10/23/2006	MIDTERM/Guest Lecture		GIS Exercise (on own)
10/30/2006	Remote Sensing	See WebCT	Remote Sensing Imagery
11/6/2006	Issues & Concerns with PA	Chap #9	Soil Data Analysis
11/13/2006	Hardware & Software Selection	See WebCT	EM-38 Data Collection (Farm)
11/20/2006	Thanksgiving Break		
11/27/2006	Paper Presentations		EM-38 Data Analysis
12/4/2006	Paper Presentations		Final Map Exercise
12/12/2006	FINAL EXAM Tuesday 1000-1150, All Lab Projects Due		

Course Schedule: The course schedule is subject to change. Changes will be announced in class and posted on the course web site.