GEOSCIENCES 585
ADVANCED REMOTE SENSING
AND DIGITAL IMAGE PROCESSING
SPRING 2007

Instructor Dr. Anne Nolin
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Office Hours T, 9:00-11:00AM

Class Schedule Lecture: MW, 10:00-10:50 AM, Wilkinson 231
Lab: W 12:00-1:50PM, either in Wilkinson 210 or in the field

Course Description This course uses an end-to-end approach to learning advanced techniques in remote sensing and digital processing from field measurements to global scale observations. Topics covered include: field methods, field spectroscopy, textural analysis, spectral mixture analysis, spatial scaling relationships, atmospheric characterization and correction, calibration/validation, cloud detection and masking, and global observations. We will also explore newer approaches in remote sensing such as lidar and InSAR.

Course web site Blackboard

Textbook/Readings Field Methods in Remote Sensing, 1st ed., by Roger McCoy. Additional readings, consisting of relevant journal articles, will be assigned each week.

Course Learning Objectives

All students completing GEO 585 should be able to:

(1) Explain the physics and principles of remote sensing including resolution, geometry, radiometric concepts, spatial scaling, and active remote sensing such as lidar and InSAR
(2) Perform field remote sensing analyses including site selection, sampling strategy, field spectroscopy, instrument setup, calibration, data collection, and data analysis
(3) Perform advanced concepts in digital image processing including texture analysis, atmospheric correction, cloud detection/masking, and lidar processing.
(4) Summarize new mission concepts and advanced technologies in remote sensing

Grading Labs 30%, quizzes 25%, class participation 20%, final exam 25%. A weighting factor based on class attendance will be applied, if necessary, to determine the final grade.

Grading Scale Grades are based on the percentage of maximum points accumulated and assigned according to the following table:

A 92-100%	B+ 88-89%	C+ 78-79%	D+ 68-69%	F <60%
A- 90-91%	B 82-87%	C 72-77%	D 62-67%	
	B- 80-81%	C- 70-71%	D- 60-61%	

COURSE POLICIES

Reading Assignments

Reading assignments are required each week. Students must complete these assignments before attending the corresponding lecture. We will be having regular seminar-style discussions of classic papers and students are expected to *turn in an annotation of the journal article* and to actively participate in the discussions. Each discussion period will be led by a student who is responsible for selecting a journal article (with instructor's approval) and emailing an electronic version to the other students *one week in advance*.

Lab Assignments

Lab assignments are due the following week at the prior to your lab period. They are to be submitted electronically to the course folder. Lab assignments will be graded on the basis of content as well as writing quality. Efforts will be made to return them graded within one week after they are turned in. Late assignments will be penalized at the instructor's discretion.

Quizzes

Students are expected to take the quizzes and final exam on the scheduled dates (see schedule). If a student is unable to attend a quiz or exam due to **verifiable** unforeseeable reasons (e.g. illness, accident, etc.), the instructor will, at her discretion, decide whether to designate a make-up date.

Attendance

Students are expected to attend all lectures and labs. It is expected that students will arrive on time. A weighting factor based on class attendance will be applied, if necessary, to determine the final grade.

Special notes

If you have a conflict between religious observances and class lectures or fieldtrips please let me know in advance so these can be made up.

Students with documented disabilities who may need accommodations, who have any emergency medical information the instructor should be aware of, or who need special arrangements in the event of evacuation, should make an appointment with the instructor as early as possible, and no later than the first week of the term. Class materials will be made available in accessible format upon request.

Please review the OSU policies on classroom conduct and academic honesty at http://oregonstate.edu/admin/stucon/achon.htm.

Course Schedule (Subject to Change)

WEEK	DAY	TOPIC	READING ASSIGNMENTS	LAB
1	4/2 4/5	Introduction, Research Discussion Spatial heterogeneity, textural analysis	None	No lab
2	4/9 4/11	Design of field experiments Quiz #1; Field methods: LAI, FPAR	Field methods	Texture analysis, field methods
3	4/16 4/18	Field spectroscopy Discussion #1	Field spectroscopy	Outdoor lab using a field spectrometer
4	4/23 4/25	Atmospheric correction models Quiz #2; Atmospheric correction, continued	Atmospheric correction models	Atmospheric correction models
5	4/30 5/2	Cloud detection and masking Discussion #2	Cloud detection and masking	Cloud detection and masking
6	5/7 5/9	Scaling: from point-to-pixel and beyond Quiz #3; Lidar, continued		
7	5/14 5/16	Scaling Discussion #3		Scaling
8	5/21 5/23	Lidar Quiz #4; Lidar	Lidar	Lidar
9	5/28 5/30	Memorial Day Holiday **Note: Dr. Nolin is out of town this week**		No lab
10	6/4 6/6	New mission concepts Discussion #4	New mission concepts	
11	**6/11**	**Final Exam 2-4PM**		