

Geosciences 466/566
Digital Image Processing
Winter 2007

Instructor	Dr. Anne Nolin Wilkinson 120 nolina@science.oregonstate.edu (541) 737-8051
Office Hours	Monday 2-3pm, Tuesday 10-11am, Friday 10-11am.
Class Schedule	Lecture: Monday 11:00am-12:50pm, Wilkinson 231 Lab: Wednesday, 12:00-1:50pm, Wilkinson 210
Teaching Assistant	Brooke Medley, Wilkinson 215, medleyb@geo.oregonstate.edu
Course Description	This course focuses on the digital image processing of satellite image data. Topics include: data types, image statistics, preprocessing techniques, image enhancement, image classification, and assessment.
Prerequisites	GEO 444/544 (Remote Sensing of the Environment) or equivalent is the enforced prerequisite for this course. It is also helpful to have basic skills in algebra and statistics. Lab assignments will require use of Word processing software and Excel spreadsheets.
Course web site	Blackboard, http://my.oregonstate.edu
Textbook	Jensen, J. R., <i>Digital Image Processing: A Remote Sensing Perspective, 3rd Edition</i> , Prentice Hall.

Course Learning Objectives

All students completing GEO 466 or GEO 566 should be able to:

- (1) Acquire an understanding of remote sensing data collection, data types, image formats
- (2) Demonstrate an understanding of electromagnetic radiation principles
- (3) Perform radiometric correction, geometric correction, image enhancement, change detection, supervised and unsupervised classification
- (4) Acquire an understanding of hyperspectral image processing techniques
- (5) Assess thematic map accuracy

Additionally, graduate students completing GEO 566 should be able to:

- (6) Develop an annotated bibliography of a minimum of 10 remote sensing/digital image processing papers in their individual area of research interest
- (7) Develop a website for the annotated bibliography

Grading

Undergraduates: labs 35%, quizzes 30%, final exam 35%
Graduate students: labs 25%, quizzes 25%, annotated bibliography 25%, final exam 25%.

It is Oregon State University policy that when a graduate course is dual-listed with an undergraduate course (e.g., GEO 466/566), students taking the graduate course should receive additional education and training and must be held to higher standards of performance than students taking the undergraduate course.

In order to comply with this policy, graduate students taking GEO 566 will complete the term project individually. In addition, when grading and assigning points to student work (lab assignments, exam questions), the instructor will hold graduate students to higher standards of originality, accuracy, completeness, justification, and presentation than undergraduate students.

Grading Scale

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

A >92%	B+ 89%	C+ 76%	D+ 66%	F <60%
A- 90-92%	B >80%	C >70%	D >60%	
	B- 80%	C- 70%	D- 60%	

COURSE POLICIES

Reading Assignments

Reading assignments are required for **ALL** lectures. Students must complete these assignments before attending the corresponding lecture

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. 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 and Examinations

Starting in Week 2, quizzes will be held in lab each week. **Students are expected to take the weekly quizzes and the 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 for the quiz or to aggregate the weight of the missed quiz with that of the final exam.

Attendance

Students are expected to attend all lectures and laboratory periods. 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.

Graduate Student Annotated Bibliography

Graduate are required to complete an annotated bibliography. The subject of the annotated bibliography should be discussed with Dr. Nolin within the first two weeks of the course. Each graduate student will design a website for the annotated bibliography. The final version of this annotated bibliography is due on the last day of class.

Special notes

If you have a conflict between religious observances and class lectures or labs 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	TOPIC	READING	LAB
1	Introduction to digital image processing, remote sensing data collection, data types and image formats	Ch. 1 Ch. 2	1
2	<i>MLK Holiday on 1/15</i> Histograms, visualization and contrast stretching Quiz 1	Ch. 4	2
3	Data merging, radiometric correction Quiz 2	Ch. 5 Ch. 6	3
4	Geometric correction Quiz 3	Ch. 7	4
5	Change detection Quiz 4	Ch. 12	5
6	Contrast stretching, band ratios Quiz 5	Ch. 8	6
7	Supervised classification Quiz 6	Ch. 9	7
8	Unsupervised classification Quiz 7	Ch. 9	8
9	Hyperspectral image analysis Quiz 8	Ch. 11	9
10	Thematic map accuracy assessment	Ch. 13	No lab
11	Final Exam: Mar. 21, 12:00-2:00pm		