FEG 350/FEG 352/ERE 552
INTRODUCTION TO REMOTE SENSING
COURSE SYLLABUS

INSTRUCTOR

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REQUIRED TEXT

Remote Sensing and Image Interpretation by Lillesand, Kiefer and Chipman (fifth edition) available at Orange Book Store, Marshall Square Mall

COURSE DESCRIPTION

The class provides a qualitative and quantitative introduction to the fundamentals of acquiring, analyzing and utilizing remote sensing data in the performance of natural resource inventories, environmental quality surveys, site development studies and land use analyses. The class describes the fundamentals of remote sensing and also covers introductory concepts and methods in digital image processing for remote sensing.

COURSE OBJECTIVES

The class aims to provide understanding of

- The basic principles and concepts in remote sensing
- Commonly used terms
- The application of remote sensing
- Basic concepts in digital image processing for remote sensing analysis

PROGRAM OUTCOMES

Upon successful completion of the course students should be able to

- Describe the fundamental concepts of remote sensing
- Describe applications of remote sensing
- Describe the applicability of simple remote sensing techniques

RESPONSIBILITIES AND ATTITUDES

In order to be successful, everybody involved in this course needs to assume certain responsibilities. The professor's responsibilities include managing the overall course conduct, preparing and presenting instructional activities, preparing laboratory exercises (as appropriate), writing and grading exams, and supervising the teaching assistant. The TA's responsibilities include conducting and grading lab exercises (as appropriate), helping grade exams, helping prepare materials, and providing help during class times and office hours. The student's responsibilities are to learn the material and apply it to their profession and career. This responsibility includes attending class, completing assigned work, preparing for exams, and doing whatever is necessary to understand and retain the material. Just as the instructors should do more than simply lay out information for people to pick up, students should do more than

simply expect the instructors to supply them with knowledge. Academic dishonesty is unacceptable evidence of character and will be dealt with severely.

ASSIGNMENTS

Readings and homework problems assigned in lecture are important. Completing assigned homework will contribute to the overall grade and is highly recommended as a means to fully understand the course materials. As appropriate, solutions to homework problems will be placed on reserve in Moon library. Homework submissions will receive a grade of 0, 1, or 2. A grade of 2 will be given if homework is received on time and is complete; a grade of 1 will be given if homework is incomplete or is late; a grade of 0 will be given if homework is incomplete and late or not received at all.

GRADING

COMPONENT	FEG 350	FEG 352	ERE 552
Homework	15%	5%	5%
Project/paper	25%	10%	10%
Lab	N/A	40%	40%
Exam 1	20%	15%	15%
Exam 2	20%	15%	15%
Exam 3	20%	15%	15%

A final exam will be offered during the scheduled final exam period. The final exam will cover material from the whole course. If you take all exams, only the three highest exam grades (of a possible four) will count towards your course grade. You must take the final exam if you miss one of the regularly scheduled exams. The numerical grades you earn will average to a final numerical score for the course with letter grades assigned based on the scale shown below. The grade cutoffs may be adjusted by a point when actually assigning final grades at the end of the semester.

Undergraduate students

LETTER GRADE	RANGE OF NUMERICAL GRADE
A	90 and above
A-	87 to just less than 90
B+	84 to just less than 87
B	80 to just less than 84
B-	77 to just less than 80
C+	74 to just less than 77
C	70 to just less than 74
C-	67 to just less than 70
D	60 to just less than 67
F	Less than 60

Graduate Students

LETTER GRADE	RANGE OF NUMERICAL GRADE
A	93 and above
A-	90 to just less than 93
B+	87 to just less than 90
B	84 to just less than 87
B-	80 to just less than 84
C+	77 to just less than 80
C	74 to just less than 77
C-	70 to just less than 74
F	Less than 70

COMPUTER USE

Word processing and spreadsheet software packages are considered basic tools in modern life. These types of programs should be used for written and graphic communication and many types of quantitative analyses. Students are free to choose whatever computer facilities are most convenient while preparing their class submissions.

E-mail will be used as a common means of communicating outside class times. All students have access to an e-mail account through the Syracuse University system. Students should provide Lindi Quackenbush with a preferred e-mail address. The internet will be used for providing information throughout the course. Computer clusters at ESF and at SU provide access for those who do not have home access.

SOURCES OF SUPPORT AND CLASS ABSENCE

If you experience academic or personal difficulties that affect your studies or life, there are people and resources who will help you. In particular, the ESF Office of Student Life, 110 Bray Hall (470-6660) will provide academic support, career guidance, personal counseling, or direct you to the proper source of help. If you encounter a situation beyond your control in which you will be missing 3 or more days of classes, you can contact the Office of Student Life and they will contact all your instructors for you. Supportive documentation may be required.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

If you have an identified disability and will need accommodations, you should contact Tom Slocum in the Office of Student Life in 110 Bray Hall. He will discuss the ESF process and work with you to access supportive services. If you have a learning disability, the College will require you to provide supportive documentation and will develop an approved accommodation sheet for you. Accommodations cannot be provided until the accommodation sheet is established and we meet to discuss its applicability to this course. Accommodations cannot be established retroactively.

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PROPOSED LECTURE SCHEDULE – SPRING 2006

DATE	TOPIC	PREPARATORY READINGS
18 Jan	Introduction to remote sensing	Sections 1.1, 1.10, 4.1-4.3
23 Jan	Understanding energy interactions	Sections 1.2-1.4, 1.6
25 Jan	Remote sensing systems	Sections 1.8, 1.9, 2.1-2.4
30 Jan	Photography	Sections 2.6-2.10
1 Feb	Geometry	Sections 3.1-3.6
6 Feb	Radiometry	Sections 1.5, 2.5
8 Feb	Spatial resolution	Sections 1.9, 2.11, 2.12
13 Feb	Spectral resolution	Sections 1.9, 5.14
15 Feb	Sensors – Overview	Sections 5.1-5.3, 6.1, 6.2
20 Feb	***Exam 1 – Through Spectral Resolution***	
22 Feb	Scanning geometry	Sections 5.4, 5.5, 5.9, 5.10
27 Feb	Thermal scanners	Sections 5.6-5.8, 5.11, 5.12
1 Mar	Earth observation – Landsat	Sections 6.3-6.9
6 Mar	Earth observation – High spatial resolution	Sections 6.15 (p. 458 – 463)
8 Mar	Earth observation – SPOT & EOS	Sections 6.10-6.14, 6.18
13 Mar	***No Lecture –*** *Spring Recess*	
15 Mar	***No Lecture –*** *Spring Recess*	
20 Mar	Active sensors – Radar	Sections 8.1-8.4
22 Mar	Active sensors – Radar II	Sections 8.5-8.7
27 Mar	Introduction to image processing	Sections 7.1, 7.2
29 Mar	***Exam 2 – Through Radar***	
3 Apr	Enhancement and manipulation	Sections 7.3-7.5 (p. 517 – 525)
5 Apr	Supervised classification	Sections 4.4, 7.7-7.10
10 Apr	Unsupervised and other classification	Sections 7.11-7.13
12 Apr	Accuracy assessment	Sections 7.14-7.16
17 Apr	Hyperspectral analysis	Sections 5.14, 6.15 (p. 463 – 465), 7.18
19 Apr	Water monitoring applications	Sections 4.9, 6.17, 7.19
24 Apr	Urban applications	
26 Apr	***Exam 3 – Through Applications***	
1 May	*Paper discussions*	

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PROPOSED LABORATORY SCHEDULE – SPRING 2006

DATE	LABORATORY EXERCISE	PREPARATORY READINGS
23 Jan	Introduction to laboratory	Sections 1.1-1.4, 1.6, 2.4, 3.3, 4.1-4.4
30 Jan	Acquisition of existing imagery	Sections 2.7-2.11, 6.5-6.9
6 Feb	Vertical aerial photographs	Sections 3.1-3.6, 4.1-4.4
13 Feb	Photographic radiometry	Sections 2.5, 2.6
20 Feb	Sensors	Sections 6.1, 6.2, 6.10-6.18
27 Feb	Thermal infrared imagery	Sections 5.1-5.3, 5.6, 5.9
6 Mar	Concepts of digital imagery	Sections 1.5, 2.12
13 Mar	*NO LAB -- Spring Recess*	
20 Mar	Digital image processing using Imagine	Sections 6.5-6.9, 7.2-7.6
27 Mar	Radar imagery	Sections 8.1, 8.3, 8.4, 8.6-8.8
3 Apr	Spectral pattern recognition	Sections 7.1, 7.7-7.14
10 Apr	Image classification	Sections 7.7-7.16
17 Apr	Hyperspectral imagery	Sections 5.14, 6.15 (p. 458-463), 7.18
24 Apr	Chlorophyll mapping	Sections 4.9, 6.17
1 May	*NO LAB -- Paper discussions*	