

**GEY 446/446L/646/646L – Geologic Applications in Remote Sensing
Spring 2005
Lecture Room LFG 105 – MW 8:55 am – 9:45 pm**

Instructor: Dr. Catherine Snelson

Office Hours: T 3:00 – 4:00 pm, W 10:30 -11:30, or by appointment

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Text: Remote Sensing of the Environment An Earth Resource Perspective by John R. Jensen and Handouts that will be distributed in class

Lab Instructor: TBA

Purpose of the class

An introduction in the acquisition, processing, and interpretation of remote sensing data including satellite and aircraft data. Applications in earth and environmental sciences are stressed as well as the understanding how to obtain and manipulate the variety of data available. Topics covered include basic mapping concepts, how sensors work, the structure of remote sensing data and analysis, thermal and radar techniques, data processing, and classification schemes. Laboratory work is primarily computerized exercises

Course Objectives

Upon completion of this course, students will have acquired an introductory, but comprehensive understanding of the following topics:

1. Mapping and Resolution
2. Concepts and Types of Remote Sensing Data
3. Acquisition and Processing
4. Classification and Interpretation

Grading:

Exams (2): 20% each

Homework: 10%

Labs: 20%

Final Project: 30%

2 exams will be given over the lecture and lab exercises. Graduate students will be required to answers additional exam questions. Lab exercises will range from homework problems to analysis of remote sensing data. In addition, there will be a final project that includes the processing and interpretation of a scene. Graduate students will be required to present their final project to the class.

Labs

Labs will be applied using current remote sensing software. The student will learn how to use the software as well as understanding the limitations of manipulating remote sensing data. The students will process and analyze remote sensing data of a chosen region. The graduate students

will be required to learn at least one advanced technique beyond the general topics covered in lab.

Succeeding!

To do well in this class you should study and work with the material daily. At the end of each day, read your notes and make sure that you understand what you wrote. Better yet, re-write your notes in a second notebook using complete sentences: if something isn't clear in your own mind it will be readily apparent to you. You should do this no later than 24 hours after class. Even though they are not assigned, write out answers to the questions at the end of each chapter. If you develop a study group, you will learn more and the experience will be more enjoyable. Keep up with reading assignments, labs, and lecture material. It is harder to come from behind than to stay engaged daily. If you get confused or have questions that have not been resolved in lecture or laboratory, then do not hesitate to contact me. If you cannot make any of the office hours, call or email for an appointment.

Logistics and Policies

1. Participation:

MAT 127 or 128 is required and some computer experience is necessary. This course is for both undergraduates and graduate student so I expect that students will come to this class with very different backgrounds and levels of educational training. As a result, you may find some material difficult, feel that you are already familiar with some of the concepts, or have personal experiences that can inform us all. Whatever your situation, please share your position with us through class participation. Most importantly, however, if you are confused about a concept, **please ask questions** in class for clarification and further explanation. You will not be alone in your confusion. There are many ways to present this material, and I will attempt to find one that works for you. If you do not feel comfortable asking questions in class, please write the questions down and drop them on the front desk as you enter the room and I will address them during class.

2. Attendance

It is important that you attend class daily because we cover a lot of material, and I will provide guidance for reading assignments and exam questions regularly. You are responsible for all material covered in lectures whether or not your absence is excused. If you miss a lecture, get the notes from a classmate. **No make-up lectures, labs, or exams will be given** except as specified below. Topics covered may vary from the schedule somewhat, but the exam dates remain fixed. If you are absent from either a scheduled lecture, lab, or exam without a written medical or university excuse, you will receive a zero for the exam or lab. Excused absences are evaluated on the average of the exams actually taken. All exams will focus primarily on the most recently covered materials presented in lecture, the laboratory, and reading assignments. **Concurrent enrollment in a lab section is required.** You must enroll for a section of GEY 446L for zero credit hours or for graduate students GEY 646L.

3. Cheating, Plagiarism, and Academic Dishonesty

You are required to be familiar with university policies and procedures in the current UNLV Undergraduate Catalog. Importantly, we follow the policies on Cheating, Plagiarism, and Academic Dishonesty that are stated in the most recent UNLV Undergraduate Catalog. In the hopes of deterring incidents of cheating and/or plagiarism this class employs a "**zero tolerance**" policy meaning that if a student commits cheating or plagiarism they receive a grade of F for the class.

4. Copyright Issues

The University requires all members of the University Community to familiarize themselves and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The University will neither protect you nor defend you nor assume responsibility for employee or student violations and fair use laws. Violations of copyright laws could

subject you to federal and state civil penalties and criminal liability as well as disciplinary action under University policies. To help familiarize yourself with copyright and fair use policies, the University encourages you to visit its copyright web page at <http://www.unlv.edu/committees/copyright>.

5. Disability Services (DS)

Learning Enhancement Services (LES) houses Disability Services, Learning Strategies and Supplemental Instruction. If you have a **documented** disability that may require assistance, you will need to contact the LES for coordination in your academic accommodations. LES is located in the Reynolds Student Services Complex, suite 137. The phone number is 702-895-0866 or TTD 702-895-0652. You may visit their website at www.unlv.edu/studentlife/les. If you have a special need/disability, please let me know outside of class sometime during the first week of the course. This helps me to adjust or alter plans so that problems can be minimized and your learning experience can be maximized.

6. Writing Center

Students are welcome to use the UNLV Writing Center free of charge. Consultants can assist students at all stages of the writing process. Students may make appointments by calling the center (895-3908) or in person at FDH-240. The center can be particularly helpful when you are writing or rewriting your lab field reports.

7. Religious Holidays

As a general rule, a student missing a class or laboratory assignment because of observance of a religious holiday shall have the opportunity to make up missed work. You must notify me by the last day of late registration, to be assured of this opportunity. If this pertains to you, a clear deadline will be set for completion of work.

8. Nondiscrimination

The University of Nevada Las Vegas does not discriminate on the basis of race, color, creed, religion, national or ethnic origin, gender, age, sexual orientation, disability, or veteran status.

9. Official Extracurricular Activity

All students who represent UNLV at an official extracurricular activity shall have the opportunity to make up assignments, but you must provide official written notification to me prior to the missed class(es).

10. Learning Environment

The classroom is intended to be a place of learning. As such and as specified in the UNLV Undergraduate and Graduate Catalogs, no pagers, cell phones, or other potentially disruptive devices are allowed in either lecture or the laboratory.

CLASS SCHEDULE

Wk	Date	Lecture Topic	Assignment	Lab Topic
1	Jan 17	Introduction to Remote Sensing	Ch 1	Internet Resources
2	Jan 24	Electromagnetic Energy	Ch 2	ENVI Tutorials 1 & 2
3	Jan 31	History of Aerial Photography	Ch 3	Choose Project Area
4	Feb 7	Aerial Photography	Ch 4; HW 1	ENVI Tutorials 10 & 11
5	Feb 14	Elements of Photography	Ch 5	Obtain Data for Project Area
6	Feb 21	No Class – Monday Photogrammetry	Ch 6	Aerial Photography
7	Feb 28	Photogrammetry; Landsat and other Satellites	Ch 6; Handouts	Scene Manipulation
8	March 7	Exam 1 Digital Image Processing	Handouts	Linking GIS
9	March 14	Multispectral Remote Sensing	Ch 7; HW 2	ASTER Imagery
10	March 21	Spring Break	No Class	No Lab
11	March 28	Thermal Infrared Remote Sensing	Ch 8	MASTER Imagery
12	April 4	Active and Passive Microwave, and LIDAR Remote Sensing	Ch 9	Landsat TM Imagery
13	April 11	Exam 2 Remote Sensing of Vegetation; Water	Ch 10 & 11	LIDAR
14	April 18	Remote Sensing the Urban Landscape	Ch 12; HW 3	Classification
15	April 25	Remote Sensing of Soils, Minerals, and Geomorphology	Ch 13	Final Project
16	May 2	Class Presentations		Final Project
17	May 11	Final Exam Day		Final Project Due at 8:00 am