Geographic Remote Sensing Techniques

Introduction to Remote Sensing and Digital Image Processing

Lectures: Ellison 3621, Monday, 9:30-10:45 am

Labs: Phelps 2525, Monday, 5-7:70 pm; Wednesday 4-6:50pm

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All Homework should be send to the following email adress:

geog115B@gmail.com

Class website

http://www.geog.ucsb.edu/~bodo/classes.php?pg=classes#rs115b (login and password required for downloading class material)

Course Objective and Overview

The objective of this course is to provide an overall introduction to remote sensing, focusing primarily on the use of satellite imagery to study the environment. The intent is to learn how to use measurements made in space to study issues related to geography, environmental science, climate change, and resource management. The synoptic perspective of satellites proves ideal for studying the spatial patterns of surface phenomena and for making maps of surface features. One of the most exciting current uses of remote sensing is to monitor environmental or landscape changes.

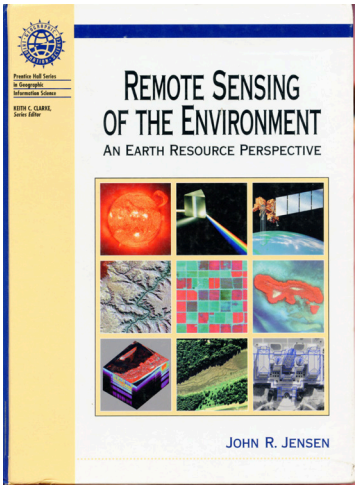
The course covers a wide range of related topics, which can be divided primarily into four categories: **Physical processes, sensors**, **applications**, and **methods**

1. We will pursue a basic understanding of the **physical processes** involved in remote sensing. The key topics here are the nature and properties of electromagnetic radiation (EMR) and how it is affected by interactions with the atmosphere and the Earth's surface.
2. We will learn about the wide variety of **sensors** used in remote sensing.

There are now many operational space-borne sensors with a wide variety of sensing capabilities in the optical, thermal, and microwave portions of the electromagnetic spectrum. The recent launch of several high resolution satellite systems and the advent of readily available data sources such as Google Earth make this a very dynamic and exciting period for remote sensing.

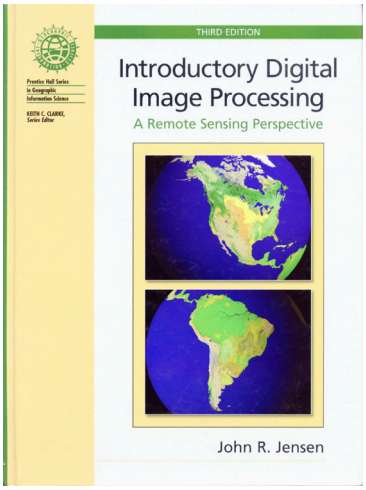
3. The motivation for remote sensing is **applications,** or how we can use remote measurements for purposes ranging from forest management to water resources to agriculture to global environmental science. Applications will be discussed nearly every day in some context, but several days will be devoted to specific examples discussed in great detail.
4. Finally, the fourth topic area is **methods**, or how to analyze images to derive the desired information. Much of this information will be taught and discussed in the Wednesday labs, devoted primarily to learning how to use image processing software to analyze satellite images. There will be a series of assignments associated with the labs which are a substantial portion of your grade.

Required Text



Remote Sensing of the Environment: An Earth Resource Perspective, John R. Jensen, 2006, Prentice Hall.

Suggested (additional) Text



Introductory Digital Image Processing: A Remote Sensing Perspective, 2nd edition, Jensen, J., 2004, Prentice Hall, 316 pp.

Additional Text

Remote Sensing Digital Image Analysis, Richards, J.A., and Jia, X., 1999, Spring Verlag, 357 pp.
Introduction to the Physics and Techniques of Remote Sensing, 1987, Elachi, C., John Wiley and Sons, NY 413 pp.
Remote Sensing, the Image Chain Approach, Schott, J.R., 1997, Oxford University Press, NY 394 pp.
R*emote Sensing: Principles and Interpretation,* Floyd F. Sabins, 1996, W. H. Freeman & Co.

Grades

homework and labs	50%
midterm	20%
final exam	25%
attendance, participation, quizzes	5%

The homework for this course involves learning to use image processing software to analyze satellite imagery. There will be approximately six assignments during the quarter, with the sixth lab serving as the final project of the class. *Discussing your assignments with classmates and even helping each other in the lab is fine and to be* encouraged. However, all materials submitted for completion of the assignments must be your own work and must be based on your own analysis of images.

Assignments turned in late will be accepted, but will receive a grade reduction of 10% per day (i.e., one day late means a penalty of 10% of your grade). The intent here is to encourage people to stay up to date on their assignments. Falling behind is a bad idea!

Because the lab portion is a fundamental part of the course, please note that you

will NOT receive a separate "lab grade." Rather, your overall grade for the course (exams, labs, and project combined) will serve as both your final lecture grade and lab grade.

Academic Conduct Code

This course will closely follow the procedures outlined in the UCSB Academic Conduct Code, available at
http://www.senate.ucsb.edu/policies/enforcement.of.facuty.code.of.conduct.pdf

Please turn off all cell phones, pagers, pdas, etc. during lecture and lab.