Syllabus

GEPL 4490/5490 Remote Sensing of the Environment

James Coss

8/23/04

Class: M-W 4:00-5:40 pm
office hours: M 3-4 pm and W 3-4 pm (please feel free to call or email me at any time.)

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Course Overview: Various forms of imagery, whether aerial photography or satellite images, let us study the Earth in new ways. We can gain landscape and even global perspectives of biogeographic, climatologic, hydrologic, geologic, and cultural (e.g. urbanization) processes with the aid of imagery collected by air and space-borne sensing systems. This course will acquaint students with the fundamentals of the remote sensing process. Students will become acquainted with a variety of airborne and satellite sensor platforms which collect data in the visible, near infrared, thermal and microwave portions of the electromagnetic spectrum. A foundation will be provided for determining which forms of imagery are best applied in different geographic analysis situations.

Grades
Grades for undergraduate credit in this class will be based on:
--2 exams of equal weight (25% each)
Midterm: Wednesday, Oct. 27, Final: Thursday, Dec. 16 at 2:45-4:45 pm
--homework and laboratory exercises (50%)

Grades for graduate credit in this class will be based on:
--2 exams of equal weight (20% each)
Midterm: Wednesday, Oct. 27, Final: Thursday, Dec. 16 at 2:45-4:45 pm
--7-10 page paper reviewing applications of remote sensing to a specific type of
geographic problem (10%)
Paper Title due: 10/6
Paper Outline due: 10/20
Paper due: 12/16
--homework and laboratory exercises (50%)

Students with Disabilities: Students with disabilities should talk to me so that appropriate arrangements can be made.

Class Text: John R. Jensen, Remote Sensing of the Environment: An Earth Resource Perspective, Prentice Hall, ISBN 0134897331.
Laboratory Exercises

Laboratory exercises will be started in class. Additional time outside of class will generally be needed to finish the lab. We will start by using aerial photographs for the labs and then move up to satellite imagery by the end of the semester.

Labs

1. Photogrammetry I, Single Aerial Photograph
2. Photogrammetry II, Stereopairs
3. Land Cover/Land Use Mapping from aerial photographs
4. Introduction to Satellite Imagery
5. Introduction to Landsat Imagery
6. Unsupervised Image Classification

I would like to try to get you out in the field this semester also taking ground observations that can be used to validate satellite imagery.

Week	Class Topic	Reading
Aug. 23	Introduction to Remote Sensing The remote sensing process	Ch. 1
Aug. 30	Electromagnetic Radiation Principles Visible/near infrared radiation – solar origin Thermal infrared radiation – earth origin	
Sept. 6	No Class – Memorial Day	Ch. 2
Sep. 8	Elements of Photographic Systems History; film characteristics; camera systems.	Ch. 3 and 4
Sep. 13	Photographic Systems Cont.	
Sep 20	Air Photo Interpretation	Ch. 5
Sep 27	Photogrammetry Characteristics of vertical photos; determining scale; measuring distances and heights of objects.	Ch. 6
Oct. 4	Photogrammetry Stereoscopic viewing-equipment; image parallax; measurements using stereopair photographs.	
Oct. 11	Oct. 15 – No Class – Fall Break	

Oct. 18	Introduction to Electronic Sensors Concept of spectral signatures; field radiometry; electronic scanning systems.	Ch. 7
Oct. 25	Review for Midterm	
Oct. 27	Midterm	
Nov. 1	Electronic Sensors Cont.	
Nov. 8	Introduction to Optical Satellite Systems Landsat/SPOT; Meteorological; Ocean	
Nov. 15	Thermal Infrared Remote Sensing(we may skip this section) Thermal signal sources and sensors; calibration issues; interpretation of data; applications.	Ch. 8
Nov. 22	Remote Sensing of Vegetation Spectral Vegetation Indices.	Ch. 10
11/24/04	No Class-Thanksgiving	
Nov. 29	Urban Remote Sensing Land Use/Land Cover Classification.	Ch. 12
Dec. 6	Digital Image Processing Data Merging and scaling issues. Microwave Remote Sensing (If we get to it.) Sensing process; interpretation of data; sensing systems- applications.	Ch. 9
12/16	Final 2:45 – 4:45 pm	