Applied Remote Sensing

GEOS 5329

GISC 7366

Spring 2006

Thursdays 4:00 – 6:45 PM

GR 3.206

Instructor:

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Office Hours: Thursdays 11:00 a.m. to 12:00 noon

Description:

The first part of the course covers the principles of remote sensing as applied to the Earth's environments. The lecture part of the course contains discussions on the principles of remote sensing that include remote sensing data collection and processing, electromagnetic radiation principles and energy-matter interaction. Description of remote sensing systems including aerial photography, visible and near infrared (VNIR) and short wave infrared (SWIR), thermal infrared (TIR) and radio detection and ranging (RADAR) systems follow this. The second part of the course is oriented towards discussions pertaining to the applications of remote sensing to understanding, managing and protecting Earth resources and environment. This includes discussion on remote sensing applications to water, vegetation, urban landscape, and geological studies. The laboratory part of the course provides a hand-on experience with spectral characteristics of natural materials and analog and digital image processing techniques and their application in characterizing land use – land cover.

Textbook:

No textbook.

Grading:

Laboratory Work: 30%

Term Project: 30%

Midterm Examination: 20%

Final Examination: 20%

Course Schedule

January	11	Introduction
		Remote Sensing of the Environment
		Principles of Electromagnetic Radiation
	18	VNIR, SWIR, TIR, and RADAR
		Remote Sensing
		Lab 1: VNIR, SWIR, TIR, RADAR Remote Sensing
	25	Remote Material Mapping
		Lab 2: Hyper-spectral Image Processing
February	01	Digital Elevation Models and Structural Mapping
		Lab 3: Development and Analysis of Three-dimensional Models
	08	Remote Sensing of Vegetation
	15	Advanced Vegetation Indices
		Lab 4: Remote Sensing of Vegetation
February	22	I will be in Saudi Arabia
March	01	Remote Sensing of Water
		Midterm Examination
	08	Spring Break
	15	Limnology and Remote Sensing
		Lab 4: Remote Sensing of Water
	22	Remote Sensing of Urban Landscape

	29	Radar Remote Sensing of Wetlands
		Lab 5: Remote Sensing of Urban Landscape
April	05	Wildfire Detection and Thermal Mapping
		Lab 6: Thermal Infrared Remote Sensing
	12	Radar Interferometry for Environmental Change Detection
	19	**Presentations**
	26	**Presentations**
		Final Examination

Term Project:

I am expecting from you to identify an environmental (vegetation, water, urban landscape) or geological (lithology, structure, mineralization) problem where remote sensing can be applied to help solving it. Make sure that you have the remote sensing data is available or can be obtained. Results of the projects will be presented on April 28, 2005. Each of you will have 10 minutes to present her/his results using power point presentations. Results of your project should also be summarized in a 10-15 pages (including figures) term paper. The term paper is due April 28, 2005.

Midterm and Final Examinations

These are 24-hours, open-book, take-home examinations. I will give you the midterm examination by the end of February 24, 2005 lecture and you should return it back to me on or before 6:00 PM on February 25, 2005. Similarly, I will give you the final examination by the end of April 28, 2005 presentations and you should return it back to me on or before 6:00 PM on April 29, 2005. Both midterm and final examinations will contain 20 short questions covering the lecture and lab parts of the course.