Principles of Remote Sensing of Natural Resources: An online course for MNR degree
NR 6940 3 credits
Fall 2015

Instructor:
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Course Description: This course will introduce fundamental concepts and develop basic skills related to the use of remote sensing data. The primary goal of the course is for students to understand remote sensing principals and their application to natural resources. The focus of the course will be on the application of remote sensing analysis to a variety of problems in natural resources, including vegetation and habitat classification, soil mapping, and land use/land cover. The first part of the course will introduce the principals of remote sensing, and students will learn how to obtain and process imagery. The second part of the course will cover imagery enhancement and interpretation. Students will learn digital imagery processing using image analysis via ArcGIS software. Grades will be based on assessments of assigned readings and labs.

Required Text:

Remote Sensing for Ecology and Conservation: A handbook of Techniques, Horning, N., J. A. Robinson, E. J. Sterling, W. Turner, and S. Spector 2010

(Teaching resource: Satellite Remote Sensing of Natural Resources.1995. David L. Verbyla. CRC Press

General Notes

- Class will use Canvas as a platform for class discussion
- Access to a PC is required

Goals of the course

1. Understand basic remote sensing concepts and appropriate applications
2. Determine what type of remotely sensed imagery is needed to answer specific questions
3. Obtain, process, analyze, and interpret remotely sensed imagery
4. Identify the limitations of remotely sensed imagery
5. Critically evaluate the use and application of remotely sensed imagery to “real-world” applications

Evaluation of student performance (grading):

Assignments

Module 1: Reading Summary	10 points
Module 2: Lab	10 points
Module 3: Lab	10 points
Module 4: Lab	20 points
Module 5: Reading Summary	15 points
Module 6: Reading Summary	15 points
Discussion Question	10 points
Module 7: Lab	10 points
Module 8: Lab	10 points
Reading Summary	15 points
Module 9: Lab	10 points
Module 10: Reading Summary	15 points
Module 11: Questions and Excel lab	15 points
Module 12: Reading Summary	10 points
Discussion Question	4 points
Writing Assignment	6 points
Module 13: Reading Summary	15 points
Discussion Question	5 points
Module 14: Reading Summary	15 points
Discussion Question	5 points
Module 15: Reading Summary	15 points
Evaluation	10 points

Assignments: Assignments will be a combination of reading assessments and lab work. The reading assessments will be a summary of the salient points from peer-reviewed papers or book chapters. Be aware that in remote sensing literature there are many ways to reference the same concept. For example, some papers define the near infrared region of the electromagnetic spectrum as a specific range of wavelengths while another paper may have a different range. The path that light travels has been referred to as “Sun-surface-sensor path” or as simply the “travel path”. Access to the internet while reading paper can help clarify confusion, although beware of incorrect information. Evaluate the source of the internet information before believing it (e.g., a NASA site likely has more reliable

information than a site about color). The reading summarys should not be longer than a single, double spaced page. Lab assignments will be of various types including short reports, essay questions, or imagery descriptions.

Course Topic Schedule

Module 1: Introduction

Reading Summary - Due August 31

Module 2: Spatial Data

Lab: Projections and Coordinate Systems - Due Sept. 7

Module 3: Electromagnetic spectrum and Atmosphere

Lab: Downloading RS imagery - Due Sept. 14

Module 4: Interactions between light and vegetation

Lab: Reprojecting and sub-setting raster data - Due Sept. 21

Module 5: Spectral characteristics of soils, snow, ice, and water

Lab: Displaying multiband imagery - Due Sept. 28

Module 6: Preprocessing corrections: radiometric and atmospheric

Reading summary - Due Oct. 5

Module 7: Geometric Correction

Lab: Image Enhancement - Due Oct. 12

Module 8: Image Indices

Lab: Image Indices - Due Oct. 19

Module 9: Unsupervised Classification

Lab: Unsupervised classification - Due Oct. 26

Module 10: Supervised Classification

Lab: Supervised Classification - Due Nov. 2

Module 11: Accuracy

Lab: Accuracy - Due Nov.9

Module 12: Land cover, land use

Lab: Land cover, land use - Due Nov. 16

Module 13: Soil classification

Lab: Soils - Due Nov. 23

Module 14: Marine and coastal classification

Lab: Marine - Due Nov. 30

Module 15: Disturbances: Fire and floods

Lab: fire and floods - Due Dec. 7

Grading Scale:

100-93%	A	76-73	C
92-90	A-	72-70	C-
89-87	B+	69-67	D+
86-83	B	66-60	D
82-80	B-	Below 60	F
79-77	C+		

Accommodation:
Students with impairments may be eligible for special accommodations. All accommodations are coordinated through the USU Disabilities Resource Center (DRC) in University Inn Room 101 (797-2444 or 1-800-259-2966). Arrangements for accommodations should be made as early in the semester as possible.

Plagiarism:
Recently a number of cases of plagiarism have been reported where a student turned in a paper in which the student simply cut and pasted passages from a series of web pages. In our new information age it is worthwhile to remind everyone about the sections of the student code that deal with cheating and plagiarism. Cheating includes intentionally: (1) using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity; (2) depending upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (3) substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work; (4) acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission; (5) engaging in any form of research fraud. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials. "

At a minimum, students turning in reports or exams that suggest cheating will be given a zero for the assignment or exam involved, and the incident will become part of the student's record. Further information on cheating consequences, as well as definitions of cheating and plagiarism are described here: http://www.usu.edu/policies/.