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:


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
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 summaries 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:

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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/](http://www.usu.edu/policies/).