Remote Sensing of the Physical Environment GR 4333/6333

Instructor: Dr. William H. Cooke
Prerequisites: Consent of Instructor
Course Description:

Remote Sensing (RS) and Geographic Information Systems (GIS) have become prevalent in natural resource management, in applications of earth science, geology, meteorology, transportation, and in many other disciplines. **Remote Sensing is the art and science of extracting information from an object, area, or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area, or phenomenon under investigation.** This course exposes students to the properties of light, patterns and processes, and automated processing of remotely sensed data. Students will learn to use software that is designed to **help** derive information from remotely sensed data. Use of RS software and RS/GIS analysis techniques will be taught.

Course Objectives:

1. Develop a basic understanding of how remotely sensed and geographic data can be represented;
2. Learn about the basic nature of light;
3. Review sensors and platforms;
4. Teach concepts of analyzing RS data to produce thematic maps;
5. Learn concepts of landscape patterns and underlying processes;
6. Provide hands-on opportunities to use remote sensing software to derive information from remotely sensed data. This will be accomplished through laboratory exercises and individual projects.

General Course Outline:

- General Concepts
  - Definition
  - Mapping the Earth
  - Scale
  - Resolution
  - Light
  - Sensors
- Methods and Techniques
  - Enhancement
  - Feature Space
  - Classifications
  - Accuracy Assessment
- Applications
  - Vegetation
  - Water
  - Urban

Text: Remote Sensing of the Environment: An Earth Resource Perspective, John R. Jensen
Office Hours: 9:00 a.m. - 12 a.m. Tues., Thurs., or by appointment.

Grading:
Undergraduate student grades will be based on 3, 1-hour exams (50%), labs (40%) and an individual project (10%). Lab deliverables are digital products and will be placed by the student in the appropriate file folder for grading. Labs are counted off 10 pts each day they are late. One drop grade will be allowed for the lab. Graduate student grades will be based on 3, 1-hour exams (45%), labs (40%), individual project (10%), and 1 extra assignment (5%).

Student Responsibilities
Attendance:
Students are expected to attend every class meeting. Although the lecture outlines are provided to the students, the bulk of the information is presented verbally in class.

Honor:
Students will comply with all responsibilities outlined in the current MSU Bulletin. Cheating will not be tolerated and punitive measures will be enforced according to MSU policy. Author citations must be included for all written reports and plagiarism is considered to be cheating.

Preparation:
Students should feel free to ask questions during the course of each lecture and lab, as this is the best time to clarify anything that is confusing. Please arrive in the class or lab prepared for the day's lecture by reading assigned material and by reviewing your notes. Assistance outside of regular class hours can be obtained either in regular office hours or by appointment.

Extra Credit:
No extra credit will be provided for students. Extra credit requires extra teacher effort.

Final Projects:
Final project reports will be typed (double-spaced), will address each phase of project, include graphics and (if appropriate) statistical tables developed from the project. At minimum, the final report should have the following sections:
1) Title page (including title, authors, date),
2) Introduction and Background,
3) Methods,
4) Results and Discussion, and
5) Conclusions/Recommendations.
All references should include proper literary citation. There is no page limit but it is expected that reports will be long to provide adequate coverage of the work that was performed. **Overdue reports will also have points deducted from them at a rate of 1 letter grade per day late.**

Presentations:
Each individual will present his/her project to the class in a 10 minute presentation and discussion on the last two days of class and during the scheduled final exam date.

Graduate students who elect to take this course for graduate credit will be required to develop an additional short written report.