

Forest and Natural Resource Management (FNRM) 3262 / 5262

Introductory Remote Sensing and Geospatial Analysis

Syllabus, Fall 2020, 3 credits

Course Description: This course is designed to provide students with a working knowledge of the principles and applications of remote sensing and geospatial analysis. It provides a survey of the concepts and methods of remote sensing and image analysis for mapping and monitoring natural resources, environment and land use. The laboratory provides hands-on experience, including a practical / team project, in interpretation of aerial photographs and analysis of digital images. 3 credits.

Lecture: Online via Canvas

Lab: Online via Canvas, or synchronous via Zoom

Instructor: Dr. Joe Knight
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301-E Green Hall
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Office hours: After class meetings or by appt.

Lab Instructor: Dan Heins, M.S.
Office: 210D Green Hall
E-mail: hein0041@umn.edu
Office hours: Mondays 10:30-11:30

Text: No required text, but *Introduction to Remote Sensing*, Campbell (5th Edition, 2011) would be useful

Course Goals: Understand...

- Concepts and principles of remote sensing
- Advantages and limitations of remote sensing
- Methods and techniques of remote sensing
- Applications of remote sensing to resource inventory, monitoring and analysis
- Potential of contemporary image processing and analysis systems
- Remote sensing data, analysis approaches, and their relationship to applications
- Interface between remote sensing and other geospatial technologies
- How to plan and implement a remote sensing project
- Prospects for future sensing systems and applications

Grades and Workload

	Num.	% of Course
Quizzes*	6	30
Lecture exercises**	13	15
Lab exercises**	13	20
Class project	-	35
TOTAL		100

*Points for quizzes will vary, but the total points will be scaled to 30% of the course.

** The number of exercises may vary, but they will comprise 15% of the course.

A -- achievement that is outstanding relative to the level necessary to meet course requirements.

B -- achievement that is significantly above the level necessary to meet course requirements.

C -- achievement that meets the course requirements in every respect.

D -- achievement that is worthy of credit even though it fails to meet fully the course requirements.

S -- achievement that is satisfactory, which is equivalent to a C- or better.

F (or N) -- Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an Incomplete.

I -- (Incomplete) Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing the work of the course on time. Requires a written agreement between instructor and student.

Student Expectations

It is expected that in addition to the three hours in lecture and two hours of lab, students will need to spend an additional four hours a week on outside study and project work, or a total of nine hours per week, to achieve an average or satisfactory grade in the course. While grades tend to be correlated with amount of time devoted to study and work, they are based on the quality of the work, not the hours of effort.

Workload expectations for undergraduate and graduate students differ. Undergraduates will be allowed to choose from a set of prepared projects with provided data. Graduate students may develop their own project idea, ideally from their graduate research, as well as gather their own data. In addition, quality standards for graduate student projects will be higher.

Copies of lecture slides, with diagrams and figures, will be available after each class on our Canvas site. The slides are provided to assist you in studying for the exams; they are not a substitute for attending lectures.

Class Project Overview

Students will complete a course project in which they obtain, prepare, analyze, and report on the use of remotely sensed data for an application of their choosing. For undergraduate students, three suggested projects will be available that provide pre-defined objectives (and for some, data). Students will be responsible for planning an approach and accomplishing the objectives.

Graduate Students: You may use the pre-defined projects if you wish, but you may choose your own project topic and find your own data. Graduate projects may focus on any natural resource issue so long as it requires the use of digital images or aerial photography in its completion. You are encouraged to propose a topic related to your present research activities or interests. Your project must include some usage of remotely sensed imagery or derivatives, either from a satellite, aerial, or ground platform. The imagery can be of any type, including optical, lidar, radar, or thermal. A project that uses aerial photographs or images, but which could be done as well without, is not a good choice. There are many free sources of imagery, which we will discuss in class. Please consult your instructor for other questions.

The project has two main purposes: To provide an opportunity for you to apply the skills learned in the course, and to give you experience in designing and carrying out a project from the initial idea phase to presentation of the results.

More information about the project, including instructions and due dates, are provided in Canvas.

Classroom Conduct

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community. As a student at the University you are expected adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see: http://regents.umn.edu/sites/regents.umn.edu/files/policies/Student_Conduct_Code.pdf

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

For in-person instruction, please arrive on time and stay the entire class period. If you must arrive late or leave early, please sit near the door and try to enter or exit quietly.

- Turn off or silence your electronic devices (e.g. cellphones, laptops) before class begins.

- If you use a computer during class, please refrain from using it for non-course-related activities, as this may distract other students.
- Avoid eating meals during class (drinks or light snacks are ok).

Absences and Late Policy

You are expected to be present for all in-person class meetings. You are responsible for *documenting* the legitimacy of any absences. Legitimate absences include:

- illnesses certified by Boynton Health Service or your family physician
- emergencies caused by a death or serious illness in your immediate family
- participation in intercollegiate athletic events or other official University activities
- subpoenas, jury duty, military service, and religious observances

If you know that you will need to be absent on a particular day, let the instructor know beforehand. To retake an exam or submit a late assignment without penalty, you must provide documentation of your absence. Otherwise late assignments will be subject to a 25% penalty *per day*. Late assignments will not be accepted after four days except in the case of a documented legitimate absence. There will be no makeup exams given without documentation.

Student Academic Integrity and Scholastic Dishonesty

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code:

http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html). If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: <http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html>.

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty:

<http://www1.umn.edu/oscai/integrity/student/index.html>. If you have further questions, please see the instructor.

Appropriate Student Use of Class Notes and Course Materials

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes or other materials beyond the classroom community or accepting compensation for distributing classroom notes or materials undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: <http://policy.umn.edu/education/studentresp>

Use of Personal Electronic Devices in the Classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference: <http://policy.umn.edu/education/studentresp>

Accommodations for Students with Disabilities

The University is committed to providing quality education to all students regardless of ability. Determining appropriate disability accommodations is a collaborative process. You as a student must register with Disability Services and provide documentation of your disability. The course instructor must provide information regarding a course's content, methods, and essential components. The combination of this information will be used by Disability Services to determine appropriate accommodations for a particular student in a particular course. For more information, please reference Disability Services: <http://ds.umn.edu/student-services.html>

Student Mental Health and Stress Management

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: <http://www.mentalhealth.umn.edu>

Sexual Harassment

Sexual harassment means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: <http://www1.umn.edu/regents/policies/humanresources/SexHarassment.html>

Equity, Diversity, Equal Opportunity, and Affirmative Action

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity_Diversity_EO_AA.pdf

Academic Freedom and Responsibility

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.