

Environmental Science, Policy, and Management (ESPM) 3000

Satellites to Drones: Monitoring our Changing Environment

Syllabus

Course Description: This course explores the many ways the "Geospatial Revolution" enabled by imagery from satellites, airplanes, and more recently drones, allows us to better manage our environment and natural resources. These technologies give us an unparalleled ability to identify natural and anthropogenic impacts, plan our land use to avoid such impacts, and monitor our changing world. In this course, we will: discuss how imagery is being used to solve environmental problems, experience imaging data applied to actual environmental issues, and learn about the imaging sensors used to acquire these data. We will explore imagery from satellites such as NASA's Landsat, high-resolution commercial sensors (as seen in Google Earth), aircraft-based imaging and lidar sensors, and multiple types of drones. This will include participation in a drone flight exercise, weather permitting. We will explore the future of the Geospatial Revolution in light of new and emerging imaging technologies.

Meetings: Thursdays 12:00-12:50pm, 203 Green Hall, St. Paul campus

Instructor:

Dr. Joe Knight

Dept. of Forest Resources

301E Green Hall

612-625-5354

jknight@umn.edu

Office hours: After class meetings or by appt.

Text: None, see assigned readings/videos in Moodle

Grades and Workload

	<u>%</u>
Homeworks	40
In-class activities	40
Participation	20

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 - 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.

You should expect that in addition to the 50 minutes in lecture, you will need to spend additional time on outside study 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.

Copies of lecture materials will be after each class on our Moodle site. The slides are not a substitute for attending class.

Classroom Conduct

All students at the University have the right to a civil, productive, and stimulating learning environment. In turn, instructors have a responsibility to nurture and maintain such an environment. Students who disrupt the educational process because of discourteous, threatening, harassing, or other aggressive behavior will be removed from class.

- 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 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 provided they are submitted within one week of the scheduled due date; late assignments will not be accepted after one week 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.

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 will provide 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://www1.umn.edu/regents/policies/administrative/Equity_Diversity_EO_AA.html

Course Schedule

Date	Day	Topic
9/7	TH	Course intro, syllabus review
9/14	TH	Awareness of location and space, the "Geospatial Revolution"
9/21	TH	Geospatial systems and data (GIS, GPS, hardware, software)
9/28	TH	Remote sensing (imagery, lidar)
10/5	TH	Unmanned Aircraft Systems ("drones")
10/12	TH	UAS flight operations (weather permitting)
10/19	TH	Business applications of geospatial (location-based services, spatial services)
10/26	TH	Science applications of geospatial (land use, hydrology, geomorphology, glaciology, etc.)
11/2	TH	Digital democracy, open source geo, humanitarian applications
11/9	TH	Machine learning, "big data," spatial science, cloud processing
11/16	TH	Privacy implications of persistent awareness of space
11/23	TH	HAPPY THANKSGIVING
11/30	TH	Role of government/policy in geospatial
12/7	TH	Course wrap-up, future of geospatial