

# GEOG 4400 – Remote Sensing

Fall 2019. Thursdays 6:00 – 8:50 PM, ENV 336

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## Description

This course is designed to introduce principles of remote sensing and image analysis, including:

- (1) Fundamental characteristics of electromagnetic radiation and how the energy interacts with Earth surface materials;
- (2) Remote sensing platforms and instruments;
- (3) Principles of visual interpretation and basic skills of digital image display and analysis; and
- (4) Remote sensing of vegetation, water, soils, minerals, geomorphology, and urban environments.

Students learn image sources on the Internet (including Google Earth Pro), fundamental elements of visual image interpretation, image spectral properties of typical ground objects, basics of digital image processing (Erdas Imagine), and major applications of different remote sensing methods.

## Textbook

Jensen, John R., 2006, *Remote Sensing of the Environment: An Earth Resource Perspective* (2nd edition), Prentice Hall: Upper Saddle River, NJ, 608 pages.

## Lab and Homework

Each class has an instruction session followed by an in-class lab session. Five individual homework assignments will be turned in and marked. Late homework will be marked down 10% each day. Students are required to read designated chapters for each week.

**Grading Structure** (90-100: A 80-89: B 70-79: C 60-69: D 0-59: F)

	<b>Undergraduates</b>	<b>Graduates</b>
Attendance and Labs	15%	15%
Homework (5)	45%	35%
Mid-term Examination	20%	15%
Final Examination	20%	15%
Course Project	-	20%
<b>Total</b>	<b>100%</b>	<b>100%</b>

## Extra Credit

The Department of Geography and the Environment does not allow extra credit assignments (work not specified on a course syllabus).

**Schedule** (\* with homework assignments due in two weeks).

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Reading</b>
1	8/29	<b>What Is Remote Sensing?</b> Exercise 1: Google Earth Pro: Placemark, tour, KMZ, and movie maker.	Chapters 1, 2, and 3
2*	9/5	<b>Electromagnetic Radiation Principles</b> Exercise 2: Measurement and analysis of target reflectance <b>(Homework 1)</b>	Chapter 7
3	9/12	<b>Elements of Visual Interpretation</b> Exercise 3: Interpretation of aerial and satellite imagery	Chapter 5
4*	09/19	<b>Multispectral Remote Sensing Systems (1)</b> Exercise 4: Using ERDAS Imagine image processing software (1) <b>(Homework 2)</b>	Chapter 8
5	09/26	<b>Multispectral Remote Sensing Systems (2)</b> Exercise 5: Using ERDAS Imagine image processing software (2)	Chapters 8 & 9
6	10/3	<b>Radar Remote Sensing</b> Exercise 6: Analysis and interpretation of radar imagery	Chapter 10
7	10/10	<b>Mid-term Exam</b>	
8*	10/17	<b>LiDAR Remote Sensing</b> Exercise 7: Visualization and analysis of LiDAR data <b>(Homework 3)</b>	Chapter 9
9	10/24	<b>Hyperspectral Remote Sensing</b> Exercise 8: Imagery on the Internet	Chapter 11
10*	10/31	<b>Remote Sensing of Vegetation</b> Exercise 9: Remote sensing of vegetation <b>(Homework 4)</b>	Chapter 12
11	11/7	<b>Remote Sensing of Water Resources</b> Exercise 10: Remote sensing of water Resources	Chapter 13
12*	11/14	<b>Remote Sensing of Urban Landscape</b> Exercise 11: Remote sensing of urban landscapes <b>(Homework 5)</b>	Chapter 14
13	11/21	<b>Remote Sensing of Soils, Minerals, and Geomorphology</b> Exercise 12: Remote Sensing of soils and geomorphology.	
14	11/28	<b>Thanksgiving Day (no class).</b>	
15	12/5	<b>Review</b>	
16	12/12	<b>Final Exam (6:00 pm - 8:00 pm)</b>	Project due (graduate students)

**Academic Dishonesty**

Students caught cheating or plagiarizing will receive a "0" for that particular assignment or exam. Additionally, the incident will be reported to the Office of Student Rights and Responsibilities for further penalty. According to the UNT catalog, the term "cheating" includes, but is not limited to:

- a. Use of any unauthorized assistance in taking quizzes, tests, or examinations;
- b. Dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
- c. The acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university;
- d. Dual submission of a paper or project, or resubmission of a paper or project to a different class without express permission from the instructor(s); or
- e. Any other act designed to give a student an unfair advantage.

The term "plagiarism" includes, but is not limited to:

- a. The knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and
- b. The knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

### **Classroom Courtesy**

Please follow these guidelines to avoid disrupting the class:

- a. Turn off cell phones before arriving;
- b. Do not arrive late or leave early (except for a bathroom break or emergency);
- c. Do not sleep during class;
- d. Do not work on other assignments during class;
- e. Do not talk or whisper to neighbors (except for formal class interaction).

### **Accommodations**

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at <http://www.unt.edu/oda>. You may also contact them by phone at 940.565.4323.

### **Course Evaluation**

Students will receive an email with a link to the UNT Student Perceptions of Teaching (SPOT) Course Evaluation by the end of the semester.

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