

ABE 4034-0542; EEL 3402-1F14
REMOTE SENSING IN ENGINEERING: SCIENCE, SENSORS, &
APPLICATIONS

Prof. Jasmeet Judge, Rogers Hall-275

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Meeting times: TR, 10:40-11:55am (12:35pm for exams, make-up classes, & presentations)

Room: 283, Rogers Hall

Office hours: TR after class or by appointment

Course website: <http://elearning.ufl.edu/>

Use GatorLink username and password to access the course material

Objective: The main objective of the course is to develop an understanding of remote sensing theory and systems in visible; infrared; and microwave regions of the EM spectrum. The course is divided into three parts. The first part includes science and theoretical basis of remote sensing. The second part of the course involves system characteristics of sensors used in the three regions, including sensor design, calibration, and performance issues. The third part includes student presentations on various applications of remote sensing.

The course is designed for upper division undergraduate students in the College of Engineering who have a strong background in differential/integral calculus, and preferably, in applied physics. It is primarily a lecture-based course with quizzes, exams, homework assignments, and a project.

Text Recommendations:

There is no required text. Handouts will be provided from the following books:

(C) Elachi, C., Introduction to the Physics and Techniques of Remote Sensing, John Wiley & Sons, 1987.

(LK) Lilesand and Keifer, Remote Sensing and Image Interpretation, John Wiley & Sons, 2003

(MRS1) Ulaby, Moore, and Fung, Microwave Remote Sensing: Volume I, Fundamentals and Radiometry, Addison-Wesley, 1981

(MRS2) Ulaby, Moore, and Fung, Microwave Remote Sensing: Volume II, Active, Addison-Wesley, 1981

(S) Schott, J., Remote Sensing: The image change approach, Oxford University Press, 1997.

(SE) Schultz and Engman, Remote Sensing in Hydrology and Water Management, Springer, 2000.

(U) Ulaby, F., Fundamentals of Applied Electromagnetics, Prentice Hall, 2006.

Course Outline:

PART I: Science and Theory of Remote Sensing:

1. Introduction

Electromagnetic (EM) spectrum

Applications of remote sensing

2. Radiative transfer theory in VI, IR, & Microwave

Exam I

PART II: Sensors in Remote Sensing

1. Passive sensors used in the Visible, IR, & Microwave regions
2. Active Sensors in Visible/NIR and Microwave regions

Exam II

PART III: Remote Sensing Applications to Engineering

Student presentations.

Examples include applications in environment, agriculture, hydrology, wireless communication, defense, archaeology, etc

Course Format and Grading:

Classes will be primarily lecture-based. Grades will be assigned based upon homework assignments (25%), three quizzes (15%), two exams (20% each), project (total = 20%, with topic 2%; references 8%; outline 2%; presentation 8%).

Unless a legitimate reason is provided *prior* to the due date, any assignments turned in after the due date will count for 25% less than the scored points if turned in by the next class past the due date. The assignments turned in after the next class past the due date will not be counted at all. An exam or a project for another course *is not a legitimate reason* to miss due dates for this course.

No makeup will be offered for missed quizzes and exams unless agreed upon by the instructor based upon a legitimate reason provided *prior* to the date of the quiz/exam. For travels to professional conferences, a signed "Excused Absence Form" is required *prior* to any due dates, quizzes, and exams. The form can be downloaded from the course website.

Grading Scale:

$93 \leq A \leq 100$	$90 \leq A- < 93$	
$86 \leq B+ < 90$	$83 \leq B < 86$	$80 \leq B- < 83$
$76 \leq C+ < 80$	$73 \leq C < 76$	$70 \leq C- < 73$
$66 \leq D+ < 70$	$63 \leq D < 66$	$60 \leq D- < 63$
E < 60		

Academic Honesty

In the process of enrolling and registering for classes at the University of Florida, every student has signed and presumably understands the following statement:

"I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University".

The following information will be placed on examinations.

On my honor, I have neither given nor received unauthorized aid on this Examination.

All work submitted in this course must be your own and produced exclusively for this course. The use of sources (ideas, quotations, paraphrases) must be properly

acknowledged and documented. For the copy of the UF Honor Code and consequences of academic dishonesty, please refer to <http://www.dso.ufl.edu/sccr/honorcodes/honorcode.php>

Violations will be taken seriously and are noted on student disciplinary records. If you are in doubt regarding the requirements, please consult with the instructor before you complete any requirement of the course

Use of Library, Personal References, PC Programs and Electronic Data Bases:

These items are university property and should be utilized with other users in mind. Never remove, mark, modify nor deface resources that do not belong to you. If you are in the habit of underlining text, do it only on your personal copy. It is inconsiderate, costly to others, and dishonest to use common references otherwise.

Software Use:

All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

UF Counseling Services:

I hope to establish a class relationship and encourage dialog so that students feel comfortable discussing academic problems directly with me. In addition, resources are available on-campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling;
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
3. Sexual Assault Recovery Services (SARC), Student Health Care Center, 392-1161, sexual assault counseling; and
4. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.