EEL 3402   Remote Sensing in Engineering: Science, Sensors and Applications

1. Catalog Description – (3 credits) To develop an understanding of remote sensing theory, systems and applications using information obtained from the visible/near infrared, thermal infrared and microwave regions of the EM spectrum.

2. Pre-requisites: MAP 2302 or equivalent

3. Course Objectives - The main objective of the course is to develop an understanding of remote sensing theory and systems in visible; near-, mid-, and thermal-infrared; and microwave regions of the EM spectrum.

   The course is designed for upper division undergraduate students who have a strong background in differential and integral calculus, and preferably, in applied physics. Graduate students from non-ABE departments with similar skills may take this course as well. It is primarily a lecture-based course with two exams, a project, quizzes, and homework assignments.

4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) – 3 credits of Engineering Science

5. Relationship of course to program outcomes: Skills student will develop in this course (ABET only undergraduate courses) – a, b, c, d, e, f, g, h, i, j, k

6. Instructor – Dr. Jasmeet Judge
   a. Office location: 275 Rogers Hall
   b. Telephone: 392-1864 ext 299
   c. E-mail address: jasmeet@ufl.edu
   d. Class Web site:
   e. Office hours:

7. Teaching Assistant - None
   a. Office location:
   b. Telephone:
   c. E-mail address:
   d. Office hours:

8. Meeting Times and Location – Tuesday, Thursday 6th-7th period, 283 Rogers Hall

9. Class/laboratory schedule - 2 class periods each week consisting of 100 minutes each

10. Material and Supply Fees - None

11. Textbooks and Software Required - None
12. Recommended Reading -

13. Course Outline –
   Part 1: Science and Theory of Remote Sensing
      Introduction
      • Electromagnetic (EM) spectrum
      • Applications of remote sensing
      • Particle theory of radiation interaction
   EM
      • Wave theory and interaction
      • Atmospheric interactions
      • Radiative transfer theory in VI/IR/Microwave

   Part 2: Sensors in Remote Sensing
      Sensors used in the Visible, TIR, and microwave regions
      • Mirrors and Lenses
      • Antenna design and radiation pattern
      • System characteristics of the sensors including key devices used
      • Design, calibration and performance issues
      • Introduction to satellite and wireless communication

   Part 3: Remote Sensing Applications to Engineering

14. Attendance and Expectations - Cell phones and other electronic devices are to be silenced. No text messaging during class or exams.

   Unless a legitimate reason is provided, homework assignments turned in after the due date will count for 25% less than the scored points. The assignments turned in after the next class past the due date will not be counted at all. Problems assigned are due in my office by 5 pm on the day specified for full credit (10% deduction/day thereafter. Maximum deduction is 50%.

   Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: [https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)

15. Grading –
   3 exams 75% (15% each exam)
   Quizzes 10% (two lowest scores will not be counted)
   Homework 25%
   Project 15%
16. Grading Scale –

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>91-100</td>
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<tr>
<td>B</td>
<td>81-90</td>
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<tr>
<td>C</td>
<td>71-80</td>
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<tr>
<td>D</td>
<td>61-70</td>
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<tr>
<td>E</td>
<td>0-60</td>
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</tbody>
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“A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better).”

Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: [https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)

This statement must be included in every grade scale for 5000 level graduate syllabi:

17. Make-Up Exam Policy - If you have a University-approved excuse and arrange for it in advance, or in case of documented emergency, a make-up exam will be allowed and arrangements can be made for making up missed work. University attendance policies can be found at: [https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)

Otherwise, make-up exams will be considered only in extraordinary cases, and must be taken before the scheduled exam. The student must submit a written petition to the instructor two weeks prior to the scheduled exam and the instructor must approve the petition.

18. Honesty Policy – UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code ([http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/](http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/)) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

19. Accommodation for Students with Disabilities – Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide documentation to the student who must then provide this documentation to the course instructor when requesting accommodation.

20. UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
   - UF Counseling & Wellness Center, psychological and psychiatric services, 3190 Radio Rd, 392-1575, online: [http://www.counseling.ufl.edu/cwc/Default.aspx](http://www.counseling.ufl.edu/cwc/Default.aspx),
   - Career Resource Center, Reitz Union, career and job search services, 392-1601.
   - University Police Department, 392-1111 or 911 for emergencies
21. Software Use – All faculty, staff and student 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 uphold ourselves and our peers to the highest standards of honesty and integrity.

22. Course Evaluation – Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at: https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at: https://evaluations.ufl.edu/results.