EEL 6487    Electromagnetic Field Theory II

1. Catalog Description – (3 credits) Electromagnetic radiation, antennas, wave propagation in anisotropic media.

2. Pre-requisites - EEL 6486

3. Course Objectives -

4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) – N/A

5. Relationship of course to program outcomes: Skills student will develop in this course (ABET only undergraduate courses) – N/A

6. Instructor – Dr. Henry Zmuda
   a. Office location: 235 Larsen
   b. Telephone: 392-0990
   c. E-mail address: zmuda@ece.ufl.edu
   d. Class Web site:
   e. Office hours:

7. Teaching Assistant -
   a. Office location:
   b. Telephone:
   c. E-mail address:
   d. Office hours:

8. Meeting Times – M W F 2nd

9. Class/laboratory schedule, i.e., number of sessions each week and duration of each session - 3 class periods consisting of 50 minutes each

10. Meeting Location – 328 Benton

11. Material and Supply Fees - None

12. Textbooks and Software Required -
   a. Title: Advanced Engineering Electromagnetics
   b. Author: C.A. Balanis
   c. Publication date and edition: John Wiley & Sons, 1989
   d. ISBN number:
   e. Software: access to a software package such as Mathcad, Matlab, Mathematica, or something similar is essential
13. Recommended Reading -


14. Course Outline (provide topics covered by week or by class period) –

   I. BRIEF REVIEW OF MAXWELL’S EQUATIONS
      1. Differential Form
      2. Integral Form
      3. Boundary Conditions
      4. Wave Equation

   II. VECTOR POTENTIALS, RADIATION, AND SCATTERING  (Text Ch. 6)
      1. The Vector Potential $A$ and $F$
      2. Far-Field Radiation
      2. Radiation and Scattering Equations

   III. ELECTROMAGNETIC THEOREMS AND PRINCIPLES  (Text Ch. 7)

      1. Duality Theorem
      2. Uniqueness Theorem
      3. Image Theory
      4. Reciprocity Theorem
      5. Equivalence Theorems

   IV. RADIATION AND SCATTERING  (Text Ch. 11)
      1. Line Sources
      2. Planar Scattering
      3. Wave Transformations and Theorems
      4. Cylindrical Scattering

   V. INTEGRAL EQUATIONS AND THE MOMENT METHOD (Text Ch. 12)
      1. Integral Equation Methods
      2. Electric and Magnetic Field Integral Equations
      3. Finite Diameter Wires
VI. SPECTRAL DOMAIN TECHNIQUES (Ref. 2 above)

1. Plane Wave Representation of 2-d and 3-d Fields
2. Angular Spectra
3. Far-Field Theorems

V. Fresnel Diffraction (Ref. 2 above)

1. Fresnel’s Diffraction Formula in 2 and 3 Dimensions
2. Far Field
3. Radiated Near Field
4. Examples

15. Attendance and Expectations - Cell phones are to be silenced. No text messaging during class or exams.

Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

16. Grading –
   Midterm 45% (Possibly a take-home exam)
   Final 45% (Possibly a take-home or a project)
   Homework 10%

17. Grading Scale (e.g., 90-100 A, 85-89 B+, 80-84 B, etc.) If grades are to be curved, so state. Values should not overlap and the full grade to percentage/points map must be included. –
   A: 93-100
   A-: 90-92
   B+: 87-89
   B: 83-86
   B-: 80-82
   C+: 77-79
   C: 73-76
   C-: 70-72
   D+: 67-69
   D: 63-66
   D-: 60-62
   E: 0-59

This statement must be included in every grade scale for undergraduate level 1000-4000 syllabi:
“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
This statement must be included in every grade scale for 5000 level graduate syllabi:

“Undergraduate students, in order to graduate, 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. Graduate students, in order to graduate, must have an overall GPA of 3.0 or better (B or better). Note: a B- average is equivalent to a GPA of 2.67, 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

This statement must be included in every grade scale for 6000 level graduate syllabi:

“In order to graduate, graduate students must have an overall GPA and an upper-division GPA of 3.0 or better (B or better). Note: a B- average is equivalent to a GPA of 2.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: http://gradschool.ufl.edu/catalog/current-catalog/catalog-general-regulations.html#grades

18. 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

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.

19. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

“…failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures (http://www.dso.ufl.edu/sccr/procedures/honorcode.php)

20. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
21. 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, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
   · Career Resource Center, Reitz Union, 392-1601, career and job search services.

22. 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.