



University of Texas at El Paso
EE 3321 – Electromagnetic Field Theory
Spring 2016

Course Information

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| Course Website: | http://emlab.utep.edu/ee3321emf.htm |
| Meeting day and time: | MW, 4:30pm – 5:50pm |
| Room: | Education Bldg. 313 |
| Final Exam: | Monday, May 9, 4:00 pm – 6:45 pm |
| Course designation: | EE 3321 |
| CRN: | 23064 |
| Credit hours: | 3 |
| Lecture hours: | 3 |

Catalog Description: Fundamental laws and concepts of static and time-varying electromagnetics, wave propagation in free space and lossy media, wave reflections, transmission lines, basic radiation sources and arrays.

Instructor Information

Jesus J. Gutierrez, Ph.D. Student

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| Office: | ENGR E-315 |
| Office Hours: | M-F 10:00 am – 12:00 pm |
| E-mail: | jjgutierrez4@miners.utep.edu |

Course Materials

The following items are required for this course:

- TI85 scientific calculator or equivalent
- Access to MATLAB, Manual available at:
<http://www.mathworks.com/help/techdoc/>
- Access to the internet.
- 30 cm ruler, protractor and compass
- Engineering graph paper for homework assignments
- Textbook: Elements of Electromagnetics (6th Ed.)
Matthew N. O. Sadiku
Oxford University Press 2015
ISBN 978-0-19-932138-4
- Supplemental Textbook: Fundamentals of Electromagnetics (6th Ed.)
Fawwaz T. Ulaby
Pearson Prentice-Hall 2010
ISBN: 0-13-978-0-13-21393-1

Students should maintain a well-organized notebook that archives their syllabus, lecture notes, homework solutions, and quizzes.



Prerequisites

By Course (with grade of “C” or better):

- MATH 2313 – Calculus III
- MATH 2326 – Differential equations
- EE 2351 – Electric Circuits II
- EE 2353 – Continuous Time Signals and Systems
- PHYS 2421 – Fields and Waves

By Topic:

- Fundamental laws of electricity
- Differential equations
- Vector calculus
- Fields and waves
- MATLAB

Course Outline

Topics covered in this course include:

1. Review of vectors and vector calculus
2. Maxwell’s equations
3. Electrostatics
4. Magnetostatics
5. Waves
6. Transmission lines
7. Waveguides
8. Antennas

Course Outcomes

By the end of the semester, the student will demonstrate the ability to:

- Perform mathematical operations and solve problems using vectors and vector calculus.
- Understand devices based on electrostatic principles. Use vector calculus to solve basic electrostatic problems.
- Understand devices based on magnetostatic principles. Use vector calculus to solve basic magnetostatic problems.
- Describe and analyze electromagnetic wave propagation.
- Describe and analyze transmission lines and associated problems.
- Understand the basics of waveguides and their applications.
- Understand the basics of antennas and their various forms.



Contribution to Professional Component

EE-3321 is a junior level core course that builds on topics covered primarily in Sophomore required courses.

Relationship to (ABET) Program Outcomes

- Ability to apply knowledge of mathematics, science, and engineering:
Students use concepts from physics and calculus in the analysis of electromagnetic problems.
- Ability to identify, formulate, and solve engineering problems:
Students solve problems and observe simulations of electromagnetic problems.
- Ability to communicate effectively:
Students solve problems and discuss electromagnetic issues in class.
- Ability to use computers to enhance problem solving:
Students observe MATLAB to solve problems and visualize solutions

Rules and Policies

Grading

Student achievement in the course objectives will be assessed using a combination of homework, quizzes, and four (4) exams.

Student grades are protected by the Privacy Act of 1974.

Your course grade will be determined by your weighted performance in the following categories:

| | | |
|--------------------|-----|-----------------------|
| Homework (8) | 20% | 90% – 100% → A |
| Quizzes (10)..... | 20% | 80% – 89% → B |
| Exams (4) | 60% | 70% – 79% → C |
| | | 60% – 69% → D |
| | | 0% – 59% → F |

Homework Policy

- Homework will consist on eight (8) assignments, one for each chapter, and each worth 2.5% of the final grade.
- Homework will be graded on a 100 point scale. Unless otherwise directed, solve all problems by hand and show all work.
- You may only use a calculator or computer for basic arithmetic or to verify your work.
- Homework must be completed with a high level of professionalism and be formatted properly. Points will be deducted for sloppy work, incorrect formatting, or if not all of the work is shown.
- Your homework must be your own work. Students suspected of cheating or copying homework will be submitted to the Office of Student Conduct and Conflict Resolution and will remain part of your permanent record at UTEP.



- Homework is due at the beginning of lecture on the assigned due date.
- Late assignments will not be accepted and will be given a grade of zero (0).
- Format – Unless otherwise indicated, all homework assignments will be submitted as a single document stapled in the upper-left corner with no additional binding. The first page must be a cover sheet with the student's name, date of the assignment, course information, and assignment number. No problems or work should appear on the cover sheet.
- For your own records, it is recommended that you include a copy of the original assignment after the cover page and before your work.
- Show all of your work. You may only use a calculator or computer for basic arithmetic and to check your answers. Your solutions must be provided in the proper order and the final answer(s) must be clearly boxed and given proper units.
- Do not box intermediate results.
- Finish all calculations. For example, $3\pi, \sqrt{14}, \sin(0.2)$ are not final answers. These should be given as 9.4248, 3.7417, and 0.1987.
- If you are using engineering paper, do not use the backside.
- You do NOT need to repeat the question or problem in your answer.

Exam Policy

~ Weekly Quizzes ~

- Quizzes will be given in a weekly basis and graded on a 100 point scale, each quiz accounting for 2% of the final grade.
- There will be eleven (11) quizzes, and the quiz with the lowest grade will be dropped for a total of ten (10) quizzes accounting for the grade.
- Duration of the quizzes will be strictly enforced, and will be during the last 20 minutes of the class.
- You must show full work for credit. The final answer must be boxed and given proper units.

~ Exams ~

- There will be 4 exams, each one accounting for 15% of the final grade.
- Duration of the exam will be the time allotted for the class, but no longer.
- Full work must be shown for full credit. Work must be neat and well organized.
- The final answer must be boxed and given proper units.
- Students suspected of cheating will be submitted to the Office of Student Conduct and Conflict Resolution and will remain part of your permanent record at UTEP, along with a zero (0) grade for the test.
- The tentative schedule for the exams and the covered topics is shown in the chart below. This may be subject to change:

| Date | Exam & Chapters |
|---------------------|------------------------|
| Monday, February 15 | Exam #1, Chapters 1- 4 |
| Wednesday, March 23 | Exam #2, Chapters 5-8 |



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|----------------------------|--------------------------|
| Wednesday, April 13 | Exam #3, Chapters 9 & 10 |
| Monday, May 9 (Final Exam) | Exam #4, Chapters 11-13 |

- Some other important dates to keep in mind:

| Date | Motive |
|-----------------------------------|---------------------------------|
| Monday, January 18 | MLK Day (No Classes) |
| Wednesday, February 17 | Pope Francis Visit (No Classes) |
| Monday, March 7- Friday, March 11 | Spring Break (No Classes) |

~ Missed Exams ~

A missed exam can be made-up IF AND ONLY IF:

- (1) the reason for missing the exam is beyond the student's control, e.g. such as a medical excuse, jury duty, death in the family or automobile accident, or
- (2) prior consent is obtained from the instructor for missing the exam based on a non-frivolous reason, e.g. such as a job interview, conference, or out-of-town job related travel. In either case, the student must submit a written and signed statement describing the reasons for missing the exam, with appropriate documentation, and petition for a makeup exam. Medical excuses require a note from the doctor. **A missed exam will carry zero grade if these conditions are not met.**

Attendance Policy

Students are required to attend class and to show up to lectures on time. The course instructor reserves the right to turn away late comers and to withdraw students from the course that are repeatedly absent. Students missing more than two lectures should seriously reflect on their commitment to this course, as missing classes is highly correlated with poor performance. Students absent from lecture are still held responsible for all information discussed, homework assigned, and exams administered during that missed lecture. In some cases, absence can be forgiven if the reason is not frivolous and coordinated with the course instructor well before the lecture is missed.

Etiquette

The following items are expected from students as part of being a student in the class:

- Ask questions! Despite how “silly” or “dumb” you may think your question is, it is very likely that other students have the same question. Confusion on even small details in course material can cause bigger problems and hold you back. If you are truly embarrassed by your question, send an anonymous e-mail to the course instructor. I promise I will respond!
- Respond honestly to polls and provide real-time feedback to instructor about the course. This will contribute greatly to the quality of the course and to your success in it.
- Visit the course instructor during office hours, or by appointment, if needed.
- Treat e-mail correspondence as a professional exchange of information.
- Turn off cell phones, pagers, or anything else that may distract the class.
- Purchase the text book with the correct edition.



- Read the assigned sections of the book.
- Bring all of your course materials (text book, notebook, pens/pencils, paper, calculator, and ruler) to every class.
- Show proper etiquette during class. Do not talk, make excessive noise, or otherwise distract the class. You will be asked to leave and it will affect your grade.

Academic Dishonesty

As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. The assumption that a student's work is a fair representation of the student's ability to perform is the basis for departmental and institutional quality. All students within the Department are expected to observe appropriate standards of conduct. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or materials that attributable in the whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts will not be tolerated. Any case involving academic dishonesty will be referred to the Office of the Dean of Students. The Dean will assign a Student Judicial Affairs Coordinator who will investigate the charge and alert the student as to its disposition. Consequences of academic dishonesty may be as severe as dismissal from the University. See the Office of the Dean of Students' homepage (Office of Student Life) at <http://studentaffairs.utep.edu/dos> for more information.

You can also refer to the IEEE website for information on our code of ethics:
<http://www.ieee.org/about/corporate/governance/p7-8.html>

American Disabilities Act

The UTEP Disabled Student Services Office was established for the purpose of providing appropriate and reasonable accommodations as mandated in Section 504 of the Rehabilitation Act of 1973 (<http://www.dol.gov/oasam/regs/statutes/sec504.htm>) and the Americans with Disabilities Act (<http://www.ada.gov/>). If you have needs regarding learning disabilities, please help by reporting your special needs to the course instructor the first week of classes. For addition help, contact the Center for Accommodations and Support Services (CASS):

(915) 747-5148

cass@utep.edu

<http://sa.utep.edu/cass/>

Discrimination

I do not discriminate, nor will I allow discrimination, on the basis of age, gender, color, ethnicity, national origin, religion, disability, sexual orientation, or favorite sports team. Members of the UTEP community are protected from discrimination and harassment by the State and Federal Laws.