Course Information

Meeting day and time: TR, 9:00 am – 10:20
Room: Classroom Building C305
Final Exam: Monday, Dec. 11th, 4:00 pm – 6:45 pm
Course designation: EE 3321 - 001
CRN: 10651

What is this course about? EE 3321 is the introduction to electromagnetism and all its theory that lets us enjoy things like electric power, internet, satellites, and electronics. This course focuses on introductory concepts that comprise electrostatics and magnetostatics, as well as electromagnetic waves and their transmission across different media.

What can I expect? This course has the reputation for being a tough class, and it is tough if you do not prepare on time. It is assumed that students have some practice with vector calculus, but a review will be given during the first weeks. Additionally, students are expected to take a very active role in their learning by completing readings, coming to class ready to participate, and reviewing routinely for assignments and exams. In this course, we have evidence that every student can achieve if they are motivated to be an active learner!

Instructor Information

Jesus J. Gutierrez, Ph.D.
Assistant Professor of Instruction
Office: ENGR A-338
Office Hours: M, W 6:00 pm – 7:00 pm
T, R 3:00 pm – 5:00 pm
F 4:30 pm – 5:30 pm
E-mail: jjgutierrez4@utep.edu

Course Materials

- Subscription to McGraw-Hill Connect Platform (see Blackboard)
- Textbook (Main):
  Fundamentals of Applied Electromagnetics (7th or 8th Edition)
  Fawwaz T. Ulaby & Umberto Ravaoli
  Pearson Education, 2015, 528 pages
  Companion Website: https://em8e.eecs.umich.edu/
Textbook (Optional):

Elements of Electromagnetics (7th Ed.)
Matthew N.O. Sadiku
Oxford University Press, 2018, 920 pages

What should you bring to class everyday:
- Pen/pencil and paper/notebook for taking notes.
- TI-85 scientific calculator or equivalent
- Laptop with access to the internet and MATLAB

Course content will be delivered through Blackboard. Also, important class announcements will be delivered via Blackboard and/or e-mail. Please make sure your UTEP e-mail is working, and you have stable access to the internet.

You can install MATLAB on your laptop or computer following the UTEP link: 
https://www.utep.edu/technologysupport/ServiceCatalog/SOFTWARE_PAGES/soft_matlab.html
You will be required to create a Mathworks account to download both the software and the license using your UTEP username and password.

If a student has no computer with access to the internet, from UTEP’s Technology Support Center has borrowing services for laptops and tablets:
https://www.utep.edu/technologysupport/TSCenter/TSC_EQ_LaptopsTablets.html

UTEP’s Technology Support center also helps for technological needs beyond your scope of troubleshooting, so make sure you contact them if you encounter technical difficulties.

Prerequisites
By Course (with grade of “C” or better):
- EE 2350 – Circuits I
- PHYS 2421 – Introductory Electromagnetism
- MATH 2313 – Calculus III
- MATH 2326 – Differential Equations

Course Outline
Topics covered in this course include:
1. Review of Vectors and Vector Calculus
2. Electrostatics
3. Magnetostatics
4. Electromagnetic Waves
How can I succeed in the course? This course may be difficult to you, especially if you received A’s and B’s in previous courses for memorizing course material. However, this course is not about memorizing equations or theory. It’s about applying equations and deriving them. You may be wondering; how do I achieve this? The answer in my experience is… practice, practice, practice! If you practice enough, you will be able to recognize patterns and become familiarized with the process needed to derive equations, which will give you a deeper understanding about electromagnetics and their usefulness and presence in our everyday lives.

Rules and Policies

How is your grade determined?

Student achievement in the course objectives will be assessed using a combination of in-class work, participation, and 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:

1. Homework …………………… 25% 90% – 100% → A
2. Weekly In-class Assignments…..10% 80% – 89% → B
3. Midterm Exams (3)……………45% 70% – 79% → C
4. Final Exam …………………..15% 60% – 69% → D
5. Class Participation………………5% 0% – 59% → F

Not all students do as well as they think they will when they walk into class on the first day. Why is this? My experience tells me that:

1) Some students do not have the active learning and studying skills that they should already have at college level (it takes one or two exams to recognize this). We can fix this together.
2) Some students do now actually put the effort that is necessary (even though they think they are putting in a big effort). You can fix this if you are honest with yourself.

For some students, there may be a “gray area” between two-letter grades in the final distribution, so two people getting the same weighted average grade could get different letter grades. If you are in one of these gray areas, whether you get a higher or lower grade depends on two factors: (a) class participation and (b) whether your performance has been improving or declining over time.

What are In-Class Assignments?

Once per week, with some exceptions, there will be an assignment covering the material from previous course material. The weekly assignments will account for 10% of the final grade. The
time allotted for the assignment will be no more than 15 minutes. The assignments may be done individually or in groups. The two lowest graded in-class assignments will be dropped.

**What are the Rules for the Homework?**

- Homework will be due on Thursdays at the beginning of each class. Any submissions later than 15 minutes after class is marked as late. See my course goals below and realize that I am trying to help you succeed in your academic and professional career by giving you these rules.
- To ensure you are doing your homework professionally and get the best grade possible for your homework, **follow the rubric posted on Blackboard**.
- The homework is **done by hand**, as research suggests that doing homework by hand helps retain concepts better. Much of this course is about drawing diagrams and applying formulas, for which a laptop won’t be useful for homework or taking notes.
- As engineers, we use engineering notation to express our homework solutions. We will make use of **engineering notation** (up to two decimal places) throughout the course. For example, \(3\pi\), \(\sqrt{14}\), \(\sin (0.2)\) are **not** final answers. These should be given as 9.42, 3.74, and 0.20.
- **Uphold the honor code!** Academic Integrity is at the heart of UTEP, and we are all responsible for upholding the ideals of honor and integrity for engineering. 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 (OSCCR) and will be part of your record at UTEP.

**~ Missed Homework ~**

If for some reason you cannot finish the homework on the due date and time, the grade will be reduced proportionately to the days passed after the due date (30% for each day passed).

**What are the rules for the exams?**

- You will only have a calculator, pen or pencil, eraser, and one cheat sheet with formulas or problems with your name and UTEP ID on both sides of the paper.
- 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 using engineering notation.
- The tentative schedule for the exams is shown in the chart below, subject to change:

<table>
<thead>
<tr>
<th>Date</th>
<th>Exam #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday, September 28</td>
<td>Exam #1</td>
</tr>
<tr>
<td>Thursday, October 26</td>
<td>Exam #2</td>
</tr>
<tr>
<td>Tuesday, November 28</td>
<td>Exam #3</td>
</tr>
<tr>
<td>Tuesday, December 12</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

**~ 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: medical excuse, jury duty, death in the family or automobile accident, and

**How can you prepare for exams?** The best way to ensure that you will succeed is showing up to class, taking notes, doing all homework, and reading assignments with plenty of time to make mistakes and ask questions. Also, do not forget to sleep!
How can you participate in class if you’re shy? Although I do my best to ensure a safe space for learning for everyone to participate, there may be some students that are quiet learners. If you are a quiet learner, you can participate with honest and serious participation through student response systems, collaborating your small group during assignments, engage with me (the professor) during office hours or by e-mail, or even helping fellow students by explaining concepts inside and outside of class.

What will I achieve after taking this course? Course Goals

- This course should prepare you to succeed in future Electrical Engineering courses. You will learn how to be an active learner in the lecture hall and how to actively study. Research has shown that students who do readings/assignments before class, actively participate in class, and review notes regularly can and will succeed in this and future courses. This course is designed to equalize your readiness for class, and your effort will pay off as you practice connecting the topics together and gaining confidence in your ability!

- This course will help you in learning how to learn. How do you know you are learning? When you make mistakes, you identify what you don’t know. Making mistakes is key to learning. Recognizing gaps and asking questions is key to learning. It is best to make mistakes in homework and assignments when the stakes are low, so you are successful on the exam.

- This course will provide you with the basic concepts and skills that make up the field of electric circuits. At the end of the semester, you will:
  - Apply vector calculus to solve basic electrostatic and magnetostatic problems.
  - Analyze basic circuit devices based on electromagnetic principles.
  - Characterize the propagation of electromagnetic waves in lossless and lossy media.
  - Describe the transmission of electromagnetic waves in different media.

- This course should excite you about circuits and electrical engineering in general. Throughout the semester I hope you ask yourself and me, why is this relevant to me? Some lessons will be more obvious as they relate to everyday devices and applications. I hope that the content we learn in this semester will cause you to ask more questions, and even leave you with more questions than answers! If I get you to read some circuits and electrical engineering material other than the book on your own, share it with me! I will be a happy professor.
How successful students have done well in this course? They always read the textbook and pay attention to what they are reading and reflect on what they are unsure about. They complete their homework on time with plenty of time to make mistakes and ask questions. They value taking notes and doing assignments as valuable tools to learn. They attend each class and come prepared. They are brave and vulnerable, meaning that they are willing to make mistakes, take the chance of drawing a circuit or a solution wrong, and attempt to answer the question by themselves before checking in with a peer. They review on their own every question to see if they could teach it to someone else. Successful students don’t just get the right answer and move on, they are able to explain how they arrive at that answer.

Course Calendar

This is a tentative schedule of the course topics, and assignments, subject to change.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 29, 31</td>
<td>1a. Vector Algebra, 1b. Orthogonal Coordinate Systems</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sep 5, 7</td>
<td>1c. Calculus III Review, 1d. Scalar and Vector Fields</td>
<td>HW 1 Sep 7</td>
</tr>
<tr>
<td>3</td>
<td>Sep 12, 14</td>
<td>1e. Gradient, Divergence and Curl</td>
<td>HW 2 Sep 14</td>
</tr>
<tr>
<td>4</td>
<td>Sep 19, 21</td>
<td>2a. Charge and Current Distributions, 2b. Coulomb’s Law</td>
<td>HW 3 Sep 21</td>
</tr>
<tr>
<td>5</td>
<td>Sep 26, 28</td>
<td>2c. Gauss’s Law</td>
<td>Exam 1 Sept 28</td>
</tr>
<tr>
<td>8</td>
<td>Oct 17, 19</td>
<td>3c. Gauss’s Law for Magnetism and Ampere’s Law</td>
<td>HW 6 Oct 19</td>
</tr>
<tr>
<td>11</td>
<td>Nov 7, 9</td>
<td>4b. Stationary Loop in a Varying Magnetic Field, 4c. Moving Conductor in a Stationary Magnetic Field and total EMF</td>
<td>HW 8 –Nov 9</td>
</tr>
</tbody>
</table>
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.

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in 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.

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](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](http://www.ieee.org/about/corporate/governance/p7-8.html)

American Disabilities Act

The University is committed to providing services, equipment, and accommodations to individuals with documented disabilities to provide them with equal opportunities to participate in programs, services, and activities in compliance with Sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990, and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located
EE 3321 – Electromagnetic Theory
Course Syllabus
in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

**Discrimination Statement**

I do not discriminate, nor will I allow discrimination, on the basis of race, color, national origin, sex, religion, age, disability, genetic information, veteran’s status, sexual orientation, or gender identity. Members of the UTEP community are protected from discrimination and harassment by the State and Federal Laws.

**University Resources**

**Technology Resources**

- **UTEP Technology Support:** Students experiencing technological issues or challenges (e-mail, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. www.utep.edu/technologysupport

- **UTEP Engineering Technology Center (ETC):** Provides laptop and computer repair services for engineering students, as well as service requests for software. www.utep.edu/engineering/etc/

**Academic Resources**

- **UTEP Library:** Access to a wide range of resources including online, full-text access to thousands of journals and e-Books, plus reference services and librarian assistance for enrolled students. www.utep.edu/library/

- **Math Resource Center for Students (MaRCS):** Ask a tutor for help (including remotely) and explore available math resources like formula sheets, tables, and videos. www.utep.edu/science/math/marcs

- **Advancement Center for Engineering Students (ACES):** Students serving other students. Hybrid tutors provide tutoring for a wide range of topics including engineering, math and science, and also manages room reservations. www.utep.edu/engineering/student-resources/student-resources-aces.html

**Individual/Well-Being Services**

- **YWCA Early Learning Academy:** Conveniently located on campus to serve the, YWCA’s Early Learning Academy is the best childcare solution for UTEP students, faculty, and staff. https://www.utep.edu/student-affairs/early-learning-academy/

- **Military Student Success Center:** Assists personnel in any branch of service to reach their educational goals. www.utep.edu/student-affairs/mssc/

- **Center for Accommodations and Support Services (CASS):** Assists students with ADA-related accommodations, for coursework, housing, and internships. www.utep.edu/student-affairs/cass

- **Counseling and Psychological Services:** Provides a variety of counseling services including individual, couples, and group sessions, as well as career and disability assessments. www.utep.edu/student-affairs/counsel