

THE UNIVERSITY OF TEXAS AT EL PASO
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

**EE 3321 Electromagnetic Field Theory
Syllabus**

Semester: Spring 2023

Classroom: LART 107

Class Time: Monday and Wednesday 12:00 - 1:20 pm

Instructor: Dr. Benjamin C. Flores

Office: Eng. 336A

Office Hours: Mondays and Wednesdays 3:00 to 4:00 PM or by appointment

E-mail: bflores@utep.edu

Required Book. *Fundamentals of Applied Electromagnetics*, Seventh Edition, by Fawwaz T. Ulaby and Umberto Ravaioli, Pearson Education Inc., New Jersey, 2015.

Other Materials. All slide presentations will be posted on **Blackboard**. You are responsible for downloading files.

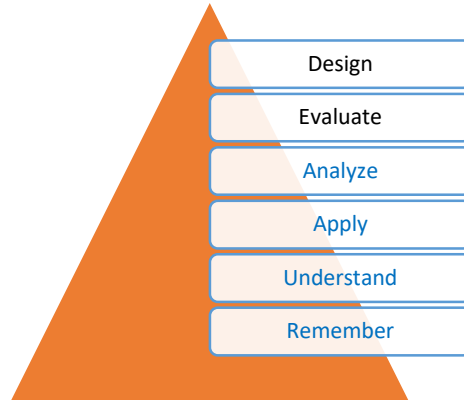
Course Topics. Nature of electromagnetism, Maxwell's equations, coordinate systems and vector operators, electrostatics, magnetostatics, time-changing fields, wave propagation in free space, and coaxial cables.

Prerequisites. Students must have earned a grade of "C" or better in EE 2351 Electric Circuits. Students must have the following prerequisite knowledge:

- Waves and phasors
- Complex numbers
- Vector operations
- Cartesian coordinate systems
- Second-order, ordinary differential equations

Course Outcomes. From an educational perspective, you are expected to *remember* (recall facts and basic concepts), *understand* (explain ideas and concepts), *apply* (use information in new situations), and *analyze* (draw connections among ideas). This is part of a taxonomy that describes your depth of knowledge as shown in the figure below.

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You are required to master the four lower levels of this taxonomy. Consequently, by the end of the semester, you will be able to:

1. Understand electromagnetic fundamentals and spatial coordinate systems.
2. Apply calculus operators.
3. Apply fundamental laws to solve basic electrostatic (resistance and capacitance) problems.
4. Apply fundamental laws to solve basic magnetostatic (inductance) problems.
5. Understand the time dependence of electric and magnetic fields and the coupling that develops between them because of time variations.
6. Apply Maxwell's equation to describe time-changing fields in circuits, space, and coaxial cables.

MATLAB Project. You are required to use MATLAB to conduct simulations of electromagnetic phenomena. There will be at least one MATLAB assignment per chapter. You will receive a handout for each assignment. Submit a report with the items described in the handout. This will include your MATLAB script, which must be unique and well-documented. Reports will be due a week after the assignment.

Quizzes. There will be a short quiz at least once every two weeks to check that you are keeping up with your studies. There are no makeup opportunities for short quizzes. You may take a quiz up to two times.

Midterm exams. There will be **three** online exams. You are responsible for finding a reliable internet connection to take these exams. Do not communicate with any class peer during the exam period. You may not take a break once you start taking the exam. Additional rules may be announced during exam periods. There will be no grading curves or negotiation on points earned. If you feel that a grading error was made, I will review the case individually. Remember you earn your grade based on the work you do.

Final Examination. There will be a 2.5-hour comprehensive online examination. The exam will become available at the scheduled time.

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Final Grade. The final grade will be determined as follows:

Quizzes	20%
Midterm Exams (15% each)	45%
Midterm MATLAB Project	15%
Final Comprehensive Examination	20%
Total (X)	100%

The corresponding letter grade scale is:

A	$87.5 \leq X \leq 100$
B	$75.0 \leq X < 87.5$
C	$65.0 \leq X < 75.0$
D	$55.0 \leq X < 65.0$
F	$X < 55.0$

Class Attendance. Attendance is essential. You're expected to attend all lecture sessions. If you are unable to attend a lecture, you are required to contact your professor as soon as you are able. Lack of attendance (4 or more classes) will result in a letter grade reduction.

In-class Behavior. Disruptive behavior may be reported to OSCCR and penalized with a letter grade reduction.

This syllabus may be modified by the instructor during the semester.

*Prepared by Prof. Benjamin C. Flores
January 2023*

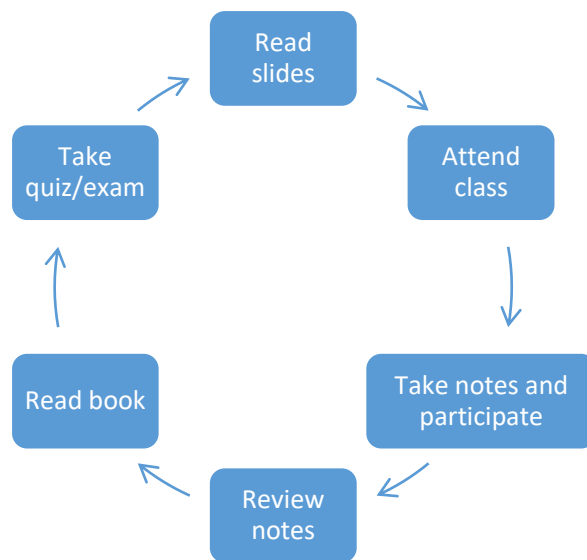
STUDY STRATEGY

Study Habits. For every hour of lecture, you are expected to dedicate at least two hours of study per day. This is a standard expectation. Thus, you should study approximately 6 hours per week or until you fully understand the material discussed in class. Time on task is essential for your success!

Participation. Everyone is expected to participate in class. In class, exercises may include pairing up for discussion.

Dedicating time and effort to this course can be achieved systematically. The process is simple but it requires your commitment. As a college student, you should strive to:

1. Study the corresponding slide presentation **before** each class period.
2. Show up to class on time.
3. Take notes, and solve collaboratively all exercises assigned in class.
4. Read the corresponding chapter sections in the book **after** each class period.
5. Review your notes, read your book and solve exercises in the book.
6. Take your quiz/exam.



A good engineering student commits to practicing this cycle. As the saying goes: ***practice makes perfect***. The expectation is that you will do your best. Your final grade should be a reflection of this effort.

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Study Groups. I encourage you to form virtual study groups of three or four people. You may get together to discuss homework problems and computer assignments. However, your solutions must be a reflection of truly individual effort.

INSTITUTIONAL RESOURCES AND POLICY

Special Accommodations. UTEP's Center for Accommodation and Support Services (CASS) was established for the purpose of providing appropriate and reasonable accommodations as mandated in Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA). If you have needs regarding learning disabilities, please help me to help you by reporting those needs the first week of classes.

Academic Integrity and Professional Ethics. Every college student must abide by professional and academic integrity rules. I expect nothing but the best from you. However, I will not hesitate to report all cases of misconduct to the Office of Student Conduct and Conflict Resolution (OSCCR). Check the OSCCR website for UTEP's policy on academic dishonesty. Also, carefully review the IEEE code of ethics below. Remember, *cheating is for losers*.

Individual Accountability. All quizzes, exams, and projects must be an individual effort. Cases of collusion will be reported to OSCCR.

Tutoring Websites. The use of tutoring websites such as chegg.com is strictly prohibited. All work submitted for grading must be strictly your own.

Counseling. Students who feel the need for mental health support are encouraged to visit UTEP's Counseling and Psychological Services (CAPS) Office. All services are strictly confidential.

Health. Students in need of primary care services, immunizations, wellness, and nutrition education are encouraged to visit UTEP's Student Health and Wellness Center. All services are strictly confidential.

Discrimination. Members of the UTEP community are protected from discrimination and harassment by State and Federal Laws. Discrimination on campus on the basis of age, gender, race, ethnicity, genetic information, national origin, religion, veteran's status, disability, sexual orientation, or gender identity is strictly prohibited.

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IEEE Code of Ethics

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to *the highest ethical and professional conduct* and agree:

1. to hold paramount the safety, health, and welfare of the public, to strive to comply with ethical design and sustainable development practices, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding by individuals and society of the capabilities and societal implications of conventional and emerging technologies, including intelligent systems;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

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Contract

Instructions: Sign this page and upload it to Blackboard as HW Assignment 1.

I have read the course syllabus and understand the policies that apply and will abide by them. Furthermore, I understand that failure to sign this document and upload it may result in a letter grade reduction.

Name _____

Signature _____

Student ID # _____

Date: _____