Course Syllabus: PHYS 2326.002.24F (FALL 2024)

Course Information

Course Number/Section	PHYS2326.002.24F
Course Title	ELECTROMAGNETISM AND WAVES
Term	FALL 2024
Classroom	SCIENCES Building lecture hall SCI 1.220
Meeting Days & Times	August 19, 2024 – December 5, 2024 Tuesdays and Thursdays, 1:00 pm – 2:15 pm

Professor Contact Information

Instructor	**Dr. Aaron Smith**
Email Address	asmith@utdallas.edu
Office Location	SCI 3.118
Office Hours	Mon/Wed, 11 am – 12 pm (or by appointment) at SCI 3.118
Teaching Assistant	Conor Ryan (Conor.Ryan@UTDallas.edu)
TA Consultation Hours	Tues/Thurs, 11:00 am – 12:00 pm (or by appointment)

Welcome to Electromagnetism and Waves!

I'm thrilled to have you in this course! We will explore the fascinating world of electromagnetism and its applications. This class is designed to build on your existing knowledge and strengthen your understanding of these core physics topics. Let's work together to make this a successful and enjoyable semester. If you have any questions or concerns, don't hesitate to reach out.

Course Pre-requisites and Co-requisites

To succeed in this course, you should have completed Calculus II (MATH 2419) or Integral Calculus (MATH 2414) or have equivalent experience. You'll also need to register for the accompanying Physics Lab. If you have any concerns about meeting these prerequisites, please feel free to discuss them with me. In general, no exceptions to these will be allowed without the instructor's and/or other advisor's permission. Familiarity with basic mathematics is assumed (including algebra, geometry, trigonometry and basic integral and differential calculus).

Course Description

Building on the core physics foundation of PHYS 2325 (Mechanics), the additional topics covered in this course include electrostatics, electromagnetics, electric fields and potentials, electric currents, magnetic fields, the laws of Coulomb, Ampere, and Faraday, and Maxwell's theory of wave propagation. We will meet twice per week for lectures that combine theory and practice.

Student Learning Objectives/Outcomes

By the end of this course, you will have a solid understanding of how fundamental equations explain electrical and magnetic phenomena in both scientific contexts and everyday life. You will also learn how these principles relate to electromagnetic radiation. The outcome is to be able to apply this background and acquired problem solving techniques to your chosen career in fields ranging from engineering to biomedicine. Your progress in terms of both mastering the material and problem-solving capability will be primarily assessed through the class exams.

Required Textbooks and Materials

Our primary textbook is "University Physics" by Young and Freedman (publisher Pearson-Addison Wesley; preferably the 15th edition but earlier versions are also fine). Make sure your textbook includes the student access kit for online homework. If you need to register, visit www.pearsonmylabandmastering.com to access the homework web site for this class.

Topics include:

Chap. 21. Electric Charge and Electric Field
Chap. 22. Gauss's Law
Chap. 23. Electric Potential
Chap. 24. Capacitance and Dielectrics
Chap. 25. Current, Resistance and Electromotive force
Chap. 26. Direct Current Circuits
Chap. 27. Magnetic Field and Magnetic Forces
Chap. 28. Sources of Magnetic Field
Chap. 29. Electromagnetic Induction
Chap. 30. Inductance
Chap. 31. Alternating Current
Chap. 32. Electromagnetic Waves

Mastering Physics is mandatory for this class. You can either get this with your textbook or purchase the access codes online. Homework is graded and assignments will be made online in Mastering Physics. The basic instructions are as follows:

To register for PHYS 2326.002.24F (Fall 2024):

- Go to https://mlm.pearson.com/enrollment/smith40747.
- Sign in with your Pearson student account or create your account.
- Select any available access option, if asked.
    - Enter a prepaid access code that came with your textbook or from the bookstore.
    - Buy instant access using a credit card or PayPal.
    - Select Get temporary access without payment for 14 days.
- Select Go to my course.
- Select **PHYS 2326.002.24F (Fall 2024)** from My Courses.

If you contact Pearson Support, give them the course ID: **smith40747**

To sign in later:

1. Go to https://mlm.pearson.com.
2. Sign in with the same Pearson account you used before.
3. Select **PHYS 2326.002.24F (Fall 2024)** from My Courses.

Note: For the online homework in Mastering Physics, a maximum of 21 tries/attempts is given for fill-in-the-blank problems whereas for multiple choice questions, points are deducted for every incorrect attempt. **Late homework:** You can still complete and earn partial credit for late weekly homework. Late homework is deducted 1% for every hour late, and you can still earn a maximum of 50% credit for correct answers for homework that is late by 2 days or more.

Assignments & Academic Calendar

PHYS2326 Lectures and Exam Dates:

LECTURE	DATE (2024)	CHAPTER	TOPIC
Lecture 1	Aug. 20 & Aug. 22	Chapter 21	Electric Charge and Field
Lecture 2	Aug. 27 & Aug. 29	Chapter 22	Gauss's Law
Lecture 3	Sep. 3 & Sep. 5	Chapter 23	Electric Potential
Lecture 4	Sep. 10 & Sep. 12	Chapter 24	Capacitance & Dielectrics
Lecture 5	Sep. 17 & Sep. 19	Chapter 25	Current, Resistance, & EMF
MIDTERM 1	**Sep. 25 – 27**	**Chapters 21-24 (UTD Testing Center)**	
Lecture 6	Oct. 1 & Oct. 3	Chapter 26	DC Circuits
Lecture 7	Oct. 8 & Oct. 10	Chapter 27	Magnetic Field & Forces
Lecture 8	Oct. 15 & Oct. 17	Chapter 28	Sources of Magnetic Field
MIDTERM 2	**Oct. 23 – 25**	**Chapters 25-28 (UTD Testing Center)**	
Lecture 9	Oct. 29 & Oct. 31	Chapter 29	Electromagnetic Induction
Lecture 10	Nov. 5 & Nov. 7	Chapter 30	Inductance
Lecture 11	Nov. 12 & Nov. 14	Chapter 31	Alternating Current
Lecture 12	Nov. 19 & Nov. 21	Chapter 32	Electromagnetic waves
FALL BREAK	**Nov. 25 – 29**	**Fall Break**	
FINAL EXAM	**Dec. 4 – 6**	**Chapters 29-32 (UTD Testing Center)**	

* Schedule may vary. Class will be optional during exam weeks, mostly for review and makeup.

Pre-test and Post-test

The Physics Department at UTD encourages PHYS2326 students to take a pre-test (Aug. 19 – Aug 30) and post-test (Nov 11 – Nov 23) for evaluation of student academic outcomes in this course in general. This is a way for our department to evaluate the progress of student learning in this course. You will need to reserve a seat **in the Testing Center** at least 48 hours before the intended exam time. The tests are typically given within a 60 minute duration.

- The **quizzes are administered in the (proctored) Testing Center** on the first floor of the Synergy Park North 2 building (SPN2) **or in the ARC office**
- Please email Prof. Paul Macalevey (paulmac@utdallas.edu), the physics faculty who manages these pre- and post-tests, if you have an OSA accommodation that involves extended time for pre- and post-tests. Alternatively, you can deliver a printed copy of the OSA letter to Prof. Macalevey at SCI 3.168 office.

To encourage you to take these tests, you will earn 1% of your grade on each test, graded as credit or no-credit for the pre-test but scored for the post-test.

Grading Policy

Your course grade will be based on 3 major exams (2 midterm exams plus the final exam), quizzes, and homework. Each of the major exams will count for 20% of your grade. The final exam is not cumulative. Homework will count for 18% of your grade. Two survey tests will be 1% each, graded as credit or no-credit for the pre-test but scored for the post-test. There will be online quizzes on eLearning almost weekly. Quizzes count for 10% of your grade.

Grade:	97 – 100%	A+
	93 – 96.99	A
	90 – 92.99	A-
	87 – 89.99	B+
	83 – 86.99	B
	80 – 82.99	B-
	77 – 79.99	C+
	73 – 76.99	C
	70 – 72.99	C-
	67 – 69.99	D+
	63 – 66.99	D
	60 – 62.99	D-
	< 59.99	F

Grading criteria summary:

Pre- and Post-tests	2%
Homework	18%
Quizzes	10%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	20%
TOTAL	100%

*Exam scores and grading will be posted on eLearning (BlackBoard) that is available on the UTD home page: *https://elearning.utdallas.edu*

Course & Instructor Policies

If you miss an exam due to extenuating circumstances, please contact me as soon as possible. Documentation such as a medical note will be required for any makeup considerations.

Class Attendance

Regular and punctual class attendance is expected. Attendance will not directly enter your final grade, however students who fail to attend class regularly are inviting scholastic difficulty.

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Texas Senate Bill 17, the recent law that prohibits diversity, equity, and inclusion programs and activities at public universities in Texas, does not in any way apply to academic course instruction. Students should not feel the need to self-censor or limit their participation in academic courses pertaining to topics of race and racism, structural inequality, LGBTQ+ issues, or diversity, equity, and inclusion, and related topics.

Lecture Notes

Copies of the lecture slides and other materials will be periodically posted on eLearning (BlackBoard) accessible from the UTD home page (*https://elearning.utdallas.edu*) with your UTD user NET ID and password. Please check the eLearning site regularly to stay up to date.

Class Materials

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments except to implement an approved AccessAbility Resource Center accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the AccessAbility Resource Center has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved AccessAbility Resource Center accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Classroom Citizenship

Be excellent to each other.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

> "As a Comet, I pledge honesty, integrity, and service in all that I do."

Accommodations for Students with Disabilities

Please review the section within the UT Dallas Syllabus Policies and Procedures webpage.

Academic Support Resources

Please visit the Academic Support Resources page to view the University's academic support resources for all students.

UT Dallas Syllabus Policies and Procedures

Please visit the Syllabus Policies page to view the University's policies and procedures segment of the course syllabus.

Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.