



Course Syllabus
PHYS2326-Fall2023
ElectroMagnetism & Waves

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Lamya Saleh

Course Number/Section	PHYS 2326.001
Course Title	Electromagnetism and Waves
Term	Fall 2023
Time & Location	Tues & Thurs 10:00 - 11:15 am, SCI 1.220
Instruction Mode:	Traditional

Instructor Contact Information

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Course Pre-requisites and Co-requisites

Pre-requisites: PHYS2325 and MATH2419 or MATH2414, Co-requisite: PHYS2126.
A modest proficiency in vectors, vector algebra and basic calculus skills is required.

Course Description:

Electromagnetism and Waves serves as an introduction into Electricity, Magnetism and Electromagnetic Waves. It is the second of the two required freshmen calculus-based physics courses. The course will be taught at the level introduced in introductory physics textbooks.

Do I need to purchase a Textbook?

We will not follow a specific textbook for this course. So you are not required to purchase one. You are encouraged to use a textbook of your choice as a reference, though. Any relatively recent Introductory physics textbook will be sufficient. Here are a few suggestions.

University Physics, Young and Freedman, Volume 2. Fundamentals of Physics, D. Halliday, R. Resnick, J. Walker. Volume 2; Physics for Scientists and Engineers, R. Serway & J. Jewett; Physics for Engineers & Scientists, H. Ohanian & J. Markert.

Is Attendance Mandatory? Although students will not be evaluated based on class participation, students who fail to attend class regularly are inviting scholastic difficulty. This is since the class is designed in a way that requires regular and punctual class attendance in order to gain mastery of the material. Please see below for more details.

Is Taking notes mandatory?

Since we are not follow a specific textbook. Our full curriculum is introduced in class through lectures and problem solving. Taking notes and keeping a record of all discussions and problems solved is essential for a successful outcome. You will find it very helpful when preparing for exams.

Do I need to purchase access to Mastering Physics ?

Access to Mastering Physics *is a requirement* for this course. In order to purchase online access please follow the instructions below.

Instructions on how to purchase access to Mastering Physics:

- Access the PHYS2326 class by logging into E-learning.
- Once you're in the homepage of the class, select from the menu to the left, "Mastering Assignments".
- Click on "MyLab and Mastering Course Home". You will then be promoted to accept terms and conditions. If you don't have an account with Mastering Physics, select "Create a Pearson Account" and complete the required fields. You will then be prompted to make your payment either by entering an access code that you can purchase from the book store or simply pay online using PayPal or with a credit card. Students who purchased access for one year when they took

PHYS2325, can simply enter their existing Pearson account username and password to sign in and will not need to make any further payments. To access your Mastering assignments later, simply login into Elearning and select Mastering Assignments.

Course Goals & Learning Outcomes: The main objective of this course is to give students a rigorous introduction to the foundations of electricity and magnetism in addition to a brief introduction into wave theory.

Specific Learning outcomes:

1. Obtain basic knowledge about charges, their relation to matter and behavior in different environments.
2. Become familiar with specific technological applications.
3. Become familiar with the models of electric and magnetic fields and applying them to solve problems.
4. Understand Gauss's Law and apply it as a tool for calculating electric Fields.
5. Obtaining basic knowledge about useful terminologies such as potential and potential energy associated with charges in fields.
6. Apply knowledge of electric and magnetic fields to construct a good understanding of specific applications such as mass spectrometers, capacitors, DC & AC circuits and motors.
7. Learn to approach science critically and develop the skill of asking questions.
8. Develop problem solving skills that will help you through your academic journey. You should develop the ability to break down a problem, relate learned concepts to real life situations and apply mathematical tools to reach your goal in the problem.

What do I need to do to succeed in this course?

This class will focus on developing *critical thinking* and *problem solving skills*.

You will be encouraged to manage your *own success and your final score* by participating in all activities and ***by using the tools provided for your success.***

Below is a list these tools

1. **Lecture summaries:** posted on elearning will provide an outline of the basic concepts we intend to cover on a specific week. We will follow a style similar to a flipped classroom, where you will be expected to prepare for class using the lecture outlines. This should allow you to actively participate in the learning process. CAUTION: *These outlines are not a sufficient learning tool on their own as they only provide a summary of what you need to know.* You are encouraged to supplement with other resources such as (introductory textbooks, Study Area on Mastering, Learning videos,etc). ***Class activities will be planned with student pre-class preparation in mind.***

2. **Quizzes:** these are low stakes quizzes which constitute 10% of your final grade. Quizzes will constitute basic questions about the material to be covered in class that week or the material covered the week before. They are provided to *give you a chance to test your understanding and to earn easy credit. These quizzes will occasionally include extra credit too. On selected weeks, Quizzes* will become available on elearning under “Quizzes and Exams” starting Friday mornings and *will be due on Tuesdays before class.*
3. **Class time :** the activities we will perform during class time will allow you to expand on your readings and practice your knowledge with a group of peers. We will be performing one or several of the following activities during class time: , Explaining concepts, introducing models, discussing problem solving strategies and solving problems in class. *Every student is expected to take notes and keep an organized record of everything we cover in class. This will be your best tool when attempting to solve weekly assignments and for preparing for tests.*
4. **In-class Problem solving sessions:** We will work together in class on a selection of questions every week as you will be asked to work with a group of classmates. *You will be strongly encouraged to participate in this peer instruction process by discussing the problem with your group members and attempting to develop a strategy. Be ready to discuss your strategy with the class if needed. Problems will eventually be solved on the board. This type of activity has been shown to be extremely useful in helping students develop problem solving skills and gain long lasting knowledge.*
5. **Mastering Assignments:** Weekly Mastering Assignments will be made *available each Tuesday after class* and will be *due on the following Monday by midnight.* All homework assignments must be completed by the deadline to achieve full credit. You may still access the assignments after the deadline to complete missing work for partial credit. You may also access them for review until the end of the semester.

Mastering Physics has been proven to be an extremely successful learning tool for students in introductory courses as it provides the feedback necessary for a healthy learning experience. Students are given the chance to *retry attempts* until they get it right. *Hints* can be useful when used with caution. The idea is for you to develop *long lasting knowledge and problem solving skills by practicing the concepts learned in class through application to real life situations.*

You are encouraged, though, to use extra caution when solving problems on Mastering and pay attention to the following:

1. Students are encouraged to discuss assignment problems with their peers, TAs or instructor. On the other hand, you are expected to answer the questions individually. This is important since these problems are chosen carefully to prepare you for success during exams.
2. The *biggest mistake is to attempt the assignment problems before you have had a chance to go over the new concepts introduced in class and try a few straight forward examples* (weekly quiz.

All textbooks provide solved examples. Make sure you try the examples yourself before looking at solutions).

3. Try not to *guess*. You may find that a certain calculation leads to a correct answer without a good understanding of why. In case this happens, do not move on without understanding the real physics behind the answer. There are many ways you can figure that out.
4. Rushing into using *hints* is specially dangerous if you are working on the problems before you have studied well the new concepts introduced in class.

Students who have followed these guidelines, have done better on exams. On the other hand, not using the Mastering tool properly has *led many students to perform below the level they expected* on exams.

Rubric for the class:

Weekly Quizzes 10%

Weekly Mastering Assignments 40%

Midterm Exams 30% , three exams with the lowest dropped (15% each).

Final Exam 20%

Extra credit up to 8% extra points toward your final grade.

Up to 5% extra credit on weekly quizzes.

2% for successfully submitting the pre-test *and* post-test

1% for achieving a good score on the post-test (*for more information on pre-tests and post-tests see the announcement posted on elearning on this subject*)

The testing Center and Exams

The testing center provide a quiet and comfortable environment to help insure our students perform their best with equal opportunities provided for all students.

Our exams will be conducted **at the testing center** and will be available at the testing center the day of the exam. **Every student must reserve a seat at the testing center for the exam no later than 48 hours prior to the exam. You must reserve your seat online through RegisterBlast (exam scheduling tool).**

If you try registering after the 48-hour cutoff deadline, instead of being able to select a time to test you will only see the error message “**All Times are Full**”. You **cannot** schedule more than one exam for one course on the same day. You **can** schedule exams for multiple courses on one day.

The testing center does **NOT ALLOW WALK-IN APPOINTMENTS, NO EXCEPTIONS.**

So, make sure you *plan ahead and register for your exam early and in advance.*

No make-ups will allowed for any reason. A missed exam is your dropped exam. More details about exams will be shared prior to exam dates.

Description of Exams

- All of our exams will be Hybrid (meaning each exam is divided into two portions, an online portion and a free response portion)
- The online portion will be accessed on Elearning on a testing center computer and will contain questions in two different formats: “Multiple choice” and “Calculated Numeric” (more details will be shared on announcements before the first exam) :
- Exams will be timed and force completion will be activated for the online portion.
- At the testing center, you will be handed a formula sheet together with your free response questions.

Schedule

Schedule is intended to give a brief overview of all material we intend to cover. *The order, date of coverage and time devoted for each section may vary based on need.*

Exam dates are final except in the case of a real emergency situation, which we don't anticipate.

Week starts	Topic
Week 1 Aug 22,24	Introduction, Course Description. Definitions and Relationships. Properties of Electric Charges; Polarization vs. Excess of Charge
Aug 28	Add/swap ends
Week 2 Aug 29,31	Electrostatics: Conductors & Insulators; Forces and Coulomb's law
Sept 6	Census Day; Last day to drop a class without a “W”
Week 3 Sept 5, 7	Electric Fields
Tuesday Sept 12 & Wednesday Sept 13	First Midterm Exam. Available at testing center during center working hours.
Sept 14	Exam review and discussion
Week 5 Sept 19,21	Gauss's Law
Week 6 Sept 26, 28	Electric Potentials. Fields and Potentials of continuous charge distributions. Potential Gradient.

Week 7 Oct 3, 5	Capacitance and Capacitors in series and in parallel; Dielectrics; Electric field Energy
Tuesday Oct 10 & Wednesday Oct 11	Second Midterm Exam. Available at testing center during center working hours
Week 8 Oct 12	Electric Currents; Electromotive force; Resistance; Ohm's Law; DC circuits; Parallel and Series circuits
Week 9 Oct 17, 19	Kirchhoff's Rules; RC circuits.
Week 10 Oct 24, 26	Magnetic fields and Magnetostatics; Magnetic force; Cathode-ray Tubes; Mass selector;
Tuesday Oct 31- Nov 1 and Nov 2	Third Midterm Exam. Available at testing center during center working hours
Nov 7	Withdrawal ends
Week 12 Nov 7, 9	Mass spectrometer; Magnetic force on current carrying wires; DC motor.
Week13 Nov 14, 16	Magnetic fields produced by moving charges ; Ampere's law Faraday's Law; Lenz's Law; Induced Electric fields
Nov 20 - Nov 26	University closed. Thanksgiving Break.
Week 14 Nov 28, 30	Mutual Inductance; Self Inductance and inductors; RL circuits
Week15 Dec 5,7	Electromagnetic Waves. Function representation of Waves; Properties of Waves.
Dec. 7	Last day of classes
Dec. 8	Reading Day
Dec. 9 - 15	Final Exam

All descriptions and timelines are subject to change at the discretion of the Instructor.

Academic Support Resources

<https://go.utdallas.edu/academic-support-resources>

Student Health Resources: a variety of resources are available to help students to obtain counseling and health care.

Code of conduct and University policies:

- Successful participation in this class is defined as consistently adhering to University and classroom requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#)
- Academic Integrity: Each student is expected to exercise independent scholarly thought, expression, and aptitude. Copying or assisting in copying of homework assignments or exams, in whole or in part, from the internet, other students or from assignments from other sections/semesters will be considered to be an act of academic dishonesty, which, once suspected, will be reported to University. Students who violate University rules on academic dishonesty are subject to disciplinary sanctions, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the University, policies on academic dishonesty will be strictly enforced. See more information on under the [Student Code of Conduct – UTSP5003](#). Those students who do not comply will be referred to the Office of Community Standards and Conduct for disciplinary action.
- Disability Services: It is the policy and practice of UTD to make reasonable accommodations for students with properly documented disabilities. However, written notification from the [Office of Student AccessAbility](#) (OSA) is required. If you are eligible to receive an accommodation and would like to request it for this course, please contact the Office of Student AccessAbility. This office evaluates the students' needs and provides an assessment. Bring the assessment to your professor. We are committed to meeting every student's needs. Please allow **one week** advance notice.
- In the event of public emergency, inclement weather, etc., that leads to unexpected closure of the university, class will not meet. Please follow the university announcement for its closure and reopening. After the event, look for Announcement on [eLearning](#) about the class reschedule.

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.”

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