Course Syllabus

ElectroMagnetism & Waves

Revised August/2022

Lamya Saleh

Course Number/Section	**PHYS 2326.004**
Course Title	**Electromagnetism and Waves**
Term	Fall 2022
Time & Location	Mon & Wed 3:00 - 4:15 pm, 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.

Instructional Mode: Traditional-Face to face.

Course Goals & Learning Outcomes:

You will learn about charges and their relation to matter, the behavior of charges in different environments and will be introduced to many technological applications. This course aims at more than just providing you with the basic knowledge. It is planned with the following learning outcomes in mind:

1. To obtain basic knowledge about charges, electric and magnetic fields and electromagnetic radiation.
2. To approach science critically and develop the skill of asking questions.
3. To 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.

Is Attendance Mandatory? Although students will not be evaluated based on attendance, regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty.

Do I need to purchase a Textbook?

We will not follow a specific textbook in this course. So you are not required to purchase one. You are encouraged to use a textbook of your choice as a reference. 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. Ohanion & J. Markert.

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.

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

We will work together to help you achieve your target goals. Considering students' different learning styles, we will implement a range of learning modes in this class with a focus on developing problem solving skills. These modes will include models and visualization, flipped classroom and peer instruction. Here is a list of resources that will be provided for you to support this learning process:

1. Flipped classroom and lecture notes: Flipped classroom style gives students more power in managing their own learning and allows them to be active participants in the process. You are expected to be ready for class by covering the basic concepts listed on the lecture notes before class. Lecture notes will be provided on elearning as a summary of the material you are responsible for learning. CAUTION: Lecture notes 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 expand on this summary using other resources (an introductory textbook, Study Area on Mastering, Khan academy videos, ….etc) before attempting to complete quizzes or assignments.
2. Weekly Quizzes: these are low stakes quizzes and will contain basic level questions about the material to be covered in class that week. They are provided to allow you to *test your preparation for class and earn easy credit.*
3. In class, we will go over the concepts, answer your questions and expand with applications and examples. Lectures will be planned with student pre-class preparation in mind.
4. Mastering Assignments: details on how to use these assignments for your success is listed below.
5. In-class problem solving sessions: We will work together in class on a selection of questions. Class will be divided into groups and you will be asked to participate actively by discussing the problem with your group before it is solved on the board. This peer instruction process is known to be very successful in enhancing the learning process.

You will be be expected to manage your own success by participating in all these activities and using the tools provided for you efficiently. This learning style makes it easy for you to *manage your final score on a weekly basis* by practicing the material covered every week through weekly quizzes and assignments.

<u>Rubric is as follows:</u>

Weekly Quizzes 10%

Weekly Mastering Assignments 40%

Three Midterm Exams 30% , the lowest dropped (15% each).

Cumulative Final Exam 20%

Extra credit up to 6 extra points toward your final grade. 2% for successfully submitting the pre-test and post-test with an extra up to 1% for achieving a good score on the post-test (for more information on pre-tests and post-tests see the first announcement posted on elearning)

Extra credit will also be offered occasionally through quizzes and assignments.

Weekly quizzes: will become available on elearning under "Quizzes and Exams" on Friday of every week and will be due on Mondays before class. These are low stakes quizzes meant to test your preparation for class and earn you low pressure credit. Quiz questions cover basic concepts.

Weekly Mastering Assignments

Weekly Mastering Assignments will be made available each Monday after class and will be *due on the following Sunday by midnight*. All homework assignments must be completed on the MasteringPhysics website accessible from elearning.

When working on assignments, students are encouraged to discuss the relevant physics concepts 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.

How to use Mastering successfully in learning the material:

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 you are unclear on how to proceed with the problem. 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 not to fall into one of the following tempting mistakes:

1. 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 problems yourself before looking at solutions).
2. The second mistake students tend to fall into is to continue to *guess different calculations that may lead to a correct answer*, then move on without understanding the real physics behind the answer.
3. Is t*o use the hints too often.* This is specially dangerous if you are working on the problems before you have studied well the new concepts introduced in class.

Students who fall into these mistakes *may easily perform below the level they expected* in exams.

Exams

All exams will be conducted **at the testing center** and will be available at the testing center the day of the exam from 8 am to 7 pm. **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, **please 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.

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; Forces and Coulomb's law
Aug 29	Add/swap ends
Week 2 Aug 29,31	Electrostatics: Electric Fields; Polarization vs. Excess of Charge; Conductors & Insulators
Monday Sept 5	Labor Day. University closed.
Sept 7	Census Day; Last day to drop a class without a "W"
Week 3 Sept 7	Electric Fields
Week 4 Sept 12	Electric Fields & Gauss's Law
Wednesday Sept 14	First Midterm Exam. Available at testing center from 8 am to 7 pm.
Week 5 Sept 19,21	Electric Potentials. Fields and Potentials of continuous charge distributions. Potential Gradient.
Week 6 Sept 26,28	Capacitance and Capacitors in series and in parallel; Dielectrics; Electric field Energy
Monday Oct 3	Second Midterm Exam. Available at testing center from 8 am to 7 pm.
Week 7 Oct 5	Electric Currents; Electromotive force; Resistance; Ohm's Law; DC circuits; Parallel and Series circuits
Week 8 Oct 10,12	Kirchhoff's Rules; RC circuits.

Week 9 Oct 17,19	Magnetic fields and Magnetostatics; Magnetic force.
Week 10 Oct 24,26	Cathode-ray Tubes; Mass selector; Mass spectrometer
Monday Oct 31	Third Midterm Exam. Available at testing center from 8 am to 7 pm.
Week11 Nov 2	Magnetic fields by moving charge; Ampere's law
Nov 8	Withdrawal ends
Week12 Nov 7,9	Time-dependent Fields; Faraday's Law; Lenz's Law; Induced Electric fields
Week 13 Nov 14,16	Mutual Inductance; Self Inductance and inductors;
Week 14 Nov 21,23	RL circuits
Nov24 - Nov.27	Thanksgiving Break. No classes
Week15 Nov. 28,30	LC circuits
Week16 Dec 5,7	Electromagnetic Waves. Function representation of Waves; Properties of Waves.
Dec. 8	Last day of classes
Wednesday, Dec. 9	Reading Day
Dec. 10 - 16	**Final Exams**

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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