

Preliminary Course Syllabus

Course Information

<i>Course Number/Section</i>	PHYSICS2326.001.13F
<i>Course Title</i>	Electromagnetism & Waves
<i>Term</i>	Fall 2013
<i>Days & Times</i>	Tuesdays and Thursdays 11:30pm-12:45pm SLC 1.102 First class meeting August 27 th

Professor Contact Information

<i>Instructor</i>	Dr Lindsay King
<i>Office Phone</i>	972 883 6743
<i>Email Address</i>	Lindsay.king@utdallas.edu
<i>Office Location</i>	ECSN 2.926
<i>Office Hours</i>	Tuesdays and Thursdays 10am-11am starting September 3 rd
<i>Other Information</i>	TA and their office hours: TBA

Course Pre-requisites, Co-requisites, and/or Other Restrictions

Prerequisites: PHYS 2325 (Mechanics) and MATH 2419 (Calculus II) or MATH 2414 (Integral Calculus) or equivalent. Students must register for Physics Lab II (PHYS 2126). No exceptions to these will be allowed without the instructor's and/or other advisor's permission. Familiarity with basic mathematics (including algebra, geometry, trigonometry and basic integral and differential calculus) is assumed.

Course Description

This course introduces the main concepts of electricity and magnetism, eventually showing how they are in fact facets of the same electromagnetic force, one of the four known fundamental forces of nature.

We start by considering static electric charges and the force between them, and then develop the concepts of electric field, electric potential energy and electric potential. The notion of capacitance, and of energy storage in an electric field is then considered. Then we allow charge to move, and introduce current and resistance. We also consider the motion of charged particles in electric and magnetic fields.

A moving electric charge, or an electric current, produces a magnetic field, and we see how these are related. Further, a time-varying magnetic field generates an electric current, and we examine how these are related too. We show how Maxwell's equations – some of the most important equations in physics – encapsulate the relationships between electric and magnetic fields, charges and currents, and we learn how electromagnetic waves originate and propagate.

Along the way, problems will be assigned or classroom examples will be presented that will demonstrate applications to physical systems. The physics that we will cover is fundamental to society, being at the heart of many biological processes and techniques used in medicine, and of numerous other fields such as wireless communication.

Student Learning Objectives/Outcomes

The primary objectives of the course are to gain an understanding of electromagnetism and its relevance to the real world, as well as to develop problem-solving skills. As a result of the

course, the student is expected to demonstrate an understanding of the key concepts of electricity and magnetism - the laws, theories and relevant findings - and to be able to apply this knowledge to problems.

Topics include:

Electric Charge, Electric Force and Electric Field
Coulomb's Law and Gauss's Law
Electric Potential Energy and Potential
Capacitance and Dielectrics
Electric Current and Resistance
Direct Current Circuits
Magnetic Field and Magnetic Force
Lorentz force law for charged particles
Electromagnetic Induction
Faraday's Law and Lenz's Law
Inductance
Maxwell's Equations
Electromagnetic Waves

Required Textbooks and Materials

We will primarily follow UNIVERSITY PHYSICS, (preferably 13th Ed.; earlier versions are also fine) by Young and Freedman, publisher Pearson-Addison Wesley. If you are purchasing the book, make sure that it includes the student access kit in order to do online homework. If you already have the book and are not already registered, you will need to register at the URL www.masteringphysics.com so that you can access the homework web site for this class. An e-text is also available online. Outline notes will be provided after each lecture.

Assignments & Academic Calendar

Class announcements will be sent out on eLearning that is available on the UTD home page. Your UTD user NET ID and password will give you access to this. You are expected to check this site at least twice a week.

Homework assignments: As soon as the course starts, you will find instructions on eLearning regarding accessing homework assignments to be completed on www.masteringphysics.com. I will also give instructions at the first class meeting on Aug 27th. You will have one week (ending 12:00 midnight at the end of the due day) after assignment to complete the problems.

Exams: There will be two interim exams and a final exam:

Exam I - TBA
Exam II - TBA
Final exam - TBA

All exams will be in the classroom or other assigned rooms.

It is expected that a student will have a basic scientific calculator and writing implements. When requested, all books, notes, computers, programmable calculators, PDAs, smartphones (e.g.

Blackberry, iPhone), cell phones, as well as all bags (backpacks, purses, etc.) are to be placed at the sides or front of the room during an exam. A student must produce his/her valid student identification card, Texas Driver's License or other valid form of photo ID if requested, in order to take any exam.

Grading Policy

Your course grade will be based on the two semester exams plus the final exam and homework average. Each of the interim exams will count for 22.5% of your grade. The final cumulative exam will count for 40% of your grade. Homework will count for 15% of your grade. For homework, some allowance will be made for missed assignments, with the lowest mark assignment being dropped. Initial assignment of letter grades will follow the usual break points.

Course Policies

The format of the class is primarily a lecture. Texting or the use of laptop computers during lectures, except for note taking, is not permitted since this can be disruptive to other students. Attendance is very important and I expect that as far as possible you will attend every class. You are responsible for all material covered in class as well as material covered in the text unless explicitly excluded. The class will start promptly at 11:30am and end shortly before 12:45am.

No make up exams will be given, but do speak with me if there are extenuating circumstances regarding absence for exams. You will be required to produce a medical note or other supporting documentation.

Lindsay King
1st August 2013

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

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