

PHYS 1304-002, the Spring Semester of 2019.

Course Description and Prerequisites

This course, Introductory Electricity and Magnetism, is for science and engineering majors and calculus based. It follows PHYS 1303, Introductory Mechanics. The focus will be on static electric charges and force, electric and magnetic fields and potentials, electric currents and circuits, and electromagnetic oscillations. As a traditional extension of E&M, geometric and physical optics will also be introduced.

The understanding and unification of electromagnetic interactions (forces) set the foundation of modern sciences and technologies. From electricity generation and transportation to electronic circuitry, from microwave oven to radio/TV signal's transmission and receiving, physics LAWS studied in E&M will help you not only to understand the world around you, but also to compete effectively in your specialized fields.

This course has its lab session in PHYS1106. The TAs (Derek Johnson dpjohnson@smu.edu and Xiaoxian Jing xjing@mail.smu.edu) of this course will be present during each lab to answer questions not only about the lab but also about homework and quizzes.

Prerequisites: PHYS 1303, Mathematical skills at Calculus and introductory vector algebra level.

Learning objectives and structure of the course

Learning outcomes The course will discuss physical principles of electrical and magnetic effects and aims to develop two equally important abilities: (1) to analyze and explain common electromagnetic and optical phenomena in terms of standard concepts; and (2) to solve quantitative problems describing electromagnetic and optical effects. The course satisfies the University Curriculum (UC) requirement. Upon its successful completion, students will meet these expectations from Pure and Applied Sciences Student Learning Outcomes:

- Students will be able to demonstrate basic facility with the methods and approaches of scientific inquiry and problem solving
- Students will be able to explain how the concepts and findings of science or technology in general, or of particular sciences or technologies, shape our world

Students will also meet these expectations from the Quantitative Reasoning Student Learning Outcomes:

- Students will be able to develop quantitative models appropriate to problems in physics
- Students will be able to apply symbolic systems of representation
- Students will be able to communicate and represent quantitative information or results numerically, symbolically, aurally, visually,

orally, or in writing.

Textbook Fundamentals of Physics (SMU edition, Chapters 21-36) by D. Halliday, R. Resnick, and J. Walker. ISBN: 9781118141519 . **You must subscribe to the WileyPLUS online learning system that comes with this textbook in order to do homework.**

Course Format and Information

The learning process consists of three parts: a self-guided study of the materials provided by the instructor before class time; the class discussion on key concepts with a focus on knowledge assimilation through class demos and solving example problems; and finally, homework assignments that need to be completed in a timely fashion. The first and the third part should each take about 1.5 and 3 hours, respectively. The class meets Tuesday and Thursday from 11:00 AM to 12:20 PM in room 123 of Fondren Science Building. Class discussions are aided by the lab/help sessions. The class schedule will mainly follow Chapters 21 through 36, at a pace a little over one chapter a week. The instructor office hour is by appointment only and should not be used to answer questions about problems in homework assignments and quizzes. Those questions should be directed to the TAs. Help sessions will be during or after the lab time, or by appointment.

Class attendance is required and checked as classroom discussions together with the in-class quizzes, which are an important part of the learning process.

Grading policy: Final grades will be computed as 10% on the questions answered (through an online tool) at the end of each self-guided study session, 20% from the in-class discussions and quizzes, 30% homework grades, 15% mid-term and 25% final exam (cumulative) grades. There is absolutely no makeup except for the two exams, yet student may choose to drop two self-study grades and two in-class grades. If not chosen, the two with the lowest grade in each category will be dropped. In class quizzes are open-book but timed. Homework must be submitted online and no late submission will be accepted. Both mid-term and final exams are in-class, close-book with a formula sheet provided. The problems for these two exams are exact copies chosen from homework and quizzes, only with numbers changed. During the two exams, only blank sheets of paper and a calculator will be allowed. No smart-phones, tablets and computers are allowed in these exams. A one-time make-up of each exam will be allowed with SMU official excuse or a medical doctor's notice. Exam make-up time will be determined with students who need it. Numerical grade and letter grade conversion is based on:

Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Numerical (%)	90.0	85.0	80.0	75.0	70.0	66.6	63.3	60.0	56.6	53.3	50.0	

Please check the university calendar for important dates and the schedule for the final exam.

Other policies:

Laptops, tablets, smartphones, Can be only used for activities related to the class, such as reading the Halliday's textbook or for mathematical computations. They

are not allowed during the mid-term and final exams.

Medically excused absences Follow SMU-wide guidelines as specified by the Provost. Verification of medical illness and request for an excused absence from class will be handled in one of two ways. A physician or staff member from health/counseling and testing will provide either (1) a hand-written note on a Health Center prescription form, or (2) a signed letter written on Health Center stationery. Excused medical absences shall have specific dates of time periods indicated. Encounter forms and walk-out Statements verify a student's visit to the Health Center BUT DO NOT INDICATE AN EXCUSED ABSENCE.

Disability Accommodations Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit <http://www.smu.edu/Provost/ALEC/DASS> to begin the process. Once registered, students should then schedule an appointment with the professor as early in the semester as possible, present a DASS Accommodation Letter, and make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

Religious Observance Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

Excused Absences for University Extracurricular Activities Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalogue)

Schedule:

Chapters	dates	Notes
21 Charge and Coulomb's Law	1/22, 24	
22 Electric Fields	1/29, 31(1 st half)	
23 Gauss' Law	1/31(2 nd half), 2/5	
24 Electrical Potential	2/7, 12	
25 Capacitance	2/14, 19	
26 Current and Resistance	2/21, 26(1 st half)	
27 Circuits	2/26(2 nd half), 28, 3/5	
Review for Mid-term	3/7	

Spring Break	3/12, 14	No classes
Mid-term	3/19	
28, 29 Magnetic Fields	3/21, 26	
30 Induction and Inductance	3/28, 4/2	
31 EM Oscillation and AC	4/4, 9, 11	
32 Maxwell's Equations	4/16	
33 Electromagnetic Waves	4/16	
34 Images	4/18, 23, 25	
35 Interference	4/30	
36 Diffraction	5/2	

Final Exam: Friday May 10, 11:30 AM – 2:30 PM

(<https://www.smu.edu/EnrollmentServices/Registrar/Enrollment/FinalExamSchedule/Spring2019>)

Useful sources:

<https://phet.colorado.edu/en/simulations/category/physics>

<http://videlectures.net/Top/Physics/>

<https://www.wileyplus.com/>