

PHYS 153: Introduction to Electricity and Magnetism (With Lab)

General Information:

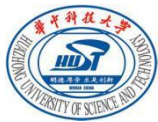
Term: 2021 Summer Session	
Instructor: Staff	
Language of Instruction: English	
Classroom: TBA	
Office Hours: TBA	
Class Sessions Per Week: 5	Lab Sessions Per week: 2
Total Weeks: 5	Total Weeks: 5
Total Class Sessions: 25	Total Laboratory Sessions: 10
Class Session Length (minutes): 145	Lab Session Length (minutes): 145
Credit Hours: 5	

Course Description:

This introductory Electricity and Magnetism course is a calculus-based, college-level physics course. It aims to provide students with an awareness that electricity and magnetism are the foundation to acquire success in the field of physical-science and engineering. Topics covered include electric charge, electric fields, Gauss's law, electric potential, capacitance, current, resistance, and circuits, magnetic fields, and fields due to currents, induction and inductance, magnetism of matter, Maxwell's equations, and electromagnetic oscillations and the beginnings of the study of electromagnetic waves.

This course is a combination of lecture and laboratory experiment. Introductory differential and integral calculus are used throughout the course.

Upon completion, students are expected to develop conceptual understanding of physics laws in electricity and magnetism, and reinforce conceptual understanding through the use of problem solving skills.



Course Format and Requirements:

Lectures:

Material involves taking time to think things through, develop the knowledge (or process) and practice this. It is also very helpful to test yourself on your knowledge development. Using the quiz or exam as a means to test if you have learned something could be too late to determine you still have a gap in knowledge. Remember, lecture is very important in seeing process and models and hearing concepts and their derivation and application BUT is not the beginning and end of learning. It would be unusual to learn something simply from sitting in lecture.

Laboratory:

The laboratory portion of the course focuses on students asking questions, making observations and predictions, designing experiments, analyzing data, and constructing arguments in a collaborative setting where they direct and monitor their progress.

Attendance

Students are expected to attend and participate in class. Strong attendance and participation are good indicators of success. Each student is responsible for all course material, announcements, quizzes and exams made in class, whether or not the student attended that day's class.

Course Materials:

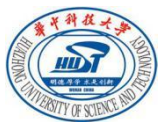
Fundamentals of Physics, Volume 2 (Chapter 21 - 33), David Halliday, Robert Resnick, Jearl Walker, 10th edition.

Course Assignments:

QUIZZES AND EXAMS

We will have 6 quizzes and 4 exams (3 midterms, 1 Final Exam) during the term.

Quizzes: *lowest one* quiz will be dropped. Quizzes will always be completed in the first 20-minutes of lecture. The quiz problems will be similar to in-class examples. There will be no make-up quizzes.



Midterm Exams will be based on concepts covered in class. It will be in-class, close-book and non-cumulative. Make-up midterm exams ONLY accept by a valid document from a doctor.

Final Exam will be cumulative and close-book. Note that the final will not be taken during the normal class times. Exact time and location for final will be announced later.

LAB ASSIGNMENTS

It is expected that all lab reports will be neatly typed (word processed) with college level grammar and spelling. Each report should include the following sections: The purpose of the experiment, the physical phenomenon observed and the concept or numerical constant to be verified; data collected and graphs of results with clearly labeled axes; an explanation and interpretation of the results and how they compare to the stated objective. Questions related to the experiment should be included and answered completely and clearly.

Course Assessment:

Quizzes (5 out of 6)	15%
Labs	15%
Midterm Exams 1	20%
Midterm Exams 2	20%
Final Exam	30%
Total	100%

Grading Scale (percentage):

A+: 98%-100%

A: 93%-97%

A-: 90%-92%

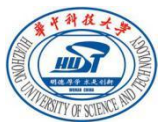
B+: 88%-89%

B: 83%-87%

B-: 80%-82%

C+: 78%-79%

C: 73%-77%



C-: 70%-72%

D+: 68%-69%

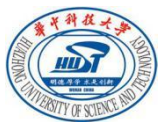
D: 63%-67%

D-: 60%-62%

F: Below 60%

Course Schedule:

Week	Topic	Activities
1 Class 1- 5	<ul style="list-style-type: none">• Introduction to course and syllabus• Chapter 21: Coulomb's Law• Chapter 22: Electric Fields• Chapter 23: Gauss' Law	Quiz 1
2 Class 6- 10	<ul style="list-style-type: none">• Chapter 24: Electric Potential• Chapter 25: Capacitance• Chapter 26: Current and Resistance	Quiz2 Midterm 1
3 Class 11- 15	<ul style="list-style-type: none">• Chapter 27: Circuits: Analyze ac circuits for currents, potentials, and phases• Chapter 28: Magnetic Fields• Chapter 29: Magnetic Fields due to Currents	Quiz 3 & 4
4 Class 16- 20	<ul style="list-style-type: none">• Chapter 30: Induction and Inductance• Chapter 31: Electromagnetic Oscillations and Alternating Current	Quiz5 Midterm2
5 Class 21- 25	<ul style="list-style-type: none">• Chapter 32: Maxwell's Equations; Magnetism of Matter• Chapter 33: Electromagnetic Waves• Review for Final	Quiz6 Final Exam



Laboratory Experiments

1. Electric Charge
2. Electric Field Plotting
3. Capacitance
4. Current Voltage Characteristics
5. Power Transfer in a DC Circuit
6. Force on a Conductor
7. Magnetic Field of a Straight Wire
8. The RC, LR Circuits
9. AC circuits
10. Speed of Light

Academic Integrity:

Students are encouraged to study together, and to discuss lecture topics with one another, but all other work should be completed independently.

Students are expected to adhere to the standards of academic honesty and integrity that are described in the Huazhong University of Science & Technology's *Academic Conduct Code*. Any work suspected of violating the standards of the *Academic Conduct Code* will be reported to the Dean's Office. Penalties for violating the *Academic Conduct Code* may include dismissal from the program. All students have an individual responsibility to know and understand the provisions of the *Academic Conduct Code*.

Special Needs or Assistance:

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.