

PHYSICS 212
ESSENTIALS OF PHYSICS II

BULLETIN INFORMATION

PHYS 212 - Essentials of Physics II (3 credit hours)

Course Description

Classical electromagnetism and optics

Corequisite: PHYS 212L

Prerequisites: a grade of C or better in PHYS 211 and MATH 142

SAMPLE COURSE OVERVIEW

PHYS 212 is the second portion of a two semester sequence in introductory physics with calculus. This course will in large part cover electricity and magnetism and related physics. These ideas will be applied to simple examples occurring throughout everyday life.

ITEMIZED LEARNING OUTCOMES

Upon successful completion of Physics 212, students will be able to:

1. Identify the concepts appropriate to analyzing situations involving physics.
2. Demonstrate the use of physical laws to solve quantitative problems in areas of: electric and magnetic fields and forces, simple circuits, energy conservation, optical properties of materials, the wave nature of light, quantum physics, and relativity.
3. Apply these concepts to a wide range of phenomena and examples from everyday life that may include topics such as: electrical devices and safety, transmission of information with electromagnetic waves, power generation, and imaging with telescopes and microscopes.
4. Demonstrate the use of scientific methods in their solutions to problems, following techniques modeled in class by the instructor.

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS

1. *University Physics*, Bauer/Westfall (or any calculus-based textbook)

SAMPLE ASSIGNMENTS AND/OR EXAMS

1. **Exams:** There will be three exams during scheduled lecture times and one cumulative final exam. Exams will consist of multiple choice questions testing quantitative problem solving skills as well conceptual understanding.
2. **Homework:** The “Learning Online with Computer Assisted Personalized Approach (LONCAPA)” system will be used to administer the homework for this class. The problems will be similar to those used on exams (but not multiple choice) and will test quantitative problem solving skills as well as conceptual understanding. The LONCAPA

system gives instant feedback and is normally configured to allow multiple attempts at each problem.

- 3. Classroom Participation:** This course makes extensive use of a classroom response system (called i>clicker) to evaluate student progress in mastering concepts and to increase student engagement during lecture. The system is especially useful in revealing, and addressing, student misconceptions about basic concepts. The i>clicker remote is a required item for this class.

SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS

Week 1: Ch. 21 Welcome and Course Introduction; Electric Charge/Coulombs Law/Electric Field

Week 2: Ch. 22 Electric Fields

Week 3: Ch. 22, 23 Gauss' Law/Electric Potential

Week 4: Ch. 23 Electric Potential

Exam 1: Chap 21-23

Week 5: Ch. 24 Capacitors

Week 6: Ch. 25 Current and Resistance

Week 7: Ch. 26 Circuits

Week 8: Ch. 27 Magnetism

Week 9: Ch. 27 More Magnetism

Exam 2: Chap 24-27

Week 10: Ch. 28 Magnetic Fields from Currents

Week 11: Ch. 29 Electromagnetic Induction

Week 12: Ch. 30 Oscillations and Circuits

Week 13: Ch. 30 More Circuits

Exam 3: Chap 28-30

Week 14: Ch. 31 E M Waves

Week 15: Last Class: Final HW Set due

FINAL EXAM According to University Schedule