

Virginia Western Community College

PHY 242

University Physics II

Prerequisites

PHY 241 with a grade of "C" or better, and MTH 264 with a grade of "C" or better.

Course Description

Covers waves, electromagnetism and optics. Includes mechanical waves and sound, electrostatics, Ohm's law and DC circuits, magnetic forces and magnetic fields, electromagnetic induction, AC circuits, ray optics, and wave optics. Part II of II.

Semester Credits: 4

Lecture Hours: 3

Laboratory Hours: 3

Required Materials

A calculator for exams and laboratory works

Textbook:

University Physics with Mastering Physics access. Young & Freeman. 15th edition. Pearson Publishing.
ISBN: any of 9780135206348, 9780135719640, 9780135717936

Course Outcomes

At the completion of this course, the student should be able to:

- Understand the oscillatory motion and the wave properties.
- Explain Snell's law and critical angle.
- Understand the polarization.
- Discuss the geometrical theory of optics and its application to lenses and other optical instruments, including the human eye.
- Use the lens and mirror equation to find the image location, image type, and magnification
- Describe the wave theory of optics and investigate the phenomena of refraction, diffraction and interference.
- Describe the behavior of static electricity and electric fields.
- Explain the nature of electric currents, resistance, and electromotive force.
- Understand the application of Ohm's Law and Kirchhoff's Rules to simple electric circuits.
- Describe the behavior of magnets and magnetic fields.
- Describe the functions of resistance and capacitance.

- Understand the Faraday's Law and its application.

Topical Description

Lecture Topics

Chapter 15	Mechanical Wave
Chapter 16	Sound and Hearing
Chapter 33	The Nature and Propagation of light
Chapter 34	Geometric Optics
Chapter 35	Interference
Chapter 21	Electric Charge and Electric Field
Chapter 22	Gauss's Law
Chapter 23	Electric Potential
Chapter 24	Capacitance and Dielectrics
Chapter 25	Current, Resistance, and Electromotive Force
Chapter 26	Direct-Current Circuits
Chapter 27	Magnetic Field and Magnetic Forces
Chapter 28	Source of Magnetic Field
Chapter 29	Electromagnetic Induction
Chapter 30	Inductance
Chapter 31	Alternating Current
Chapter 32	Electromagnetic Waves

Laboratory Topics

Lab 1	Introduction. Safety. Fitting Curves
Lab 2	Standing wave
Lab 3	Sound wave
Lab 4	Snell's law
Lab 5	Lens and mirror
Lab 6	Mapping equipotential lines
Lab 7	Adding resistors and capacitors in series and in parallel
Lab 8	DC circuit and Kirchhoff's rule
Lab 9	RC circuit and time constant
Lab 10	Magnetic field and Faraday's law
Lab 11	AC-RLC circuit

Notes to Instructors

- In order to pass the course, students should earn 50 % of the entire homework grade by the end of the semester. Earning less than 50% of homework will result in 'F grade'.

[ADA Statement \(PDF\)](#)

[Title IX Statement \(PDF\)](#)

