

Montgomery County Community College
 PHY 152
 Principles of Physics II
 (Calculus-based)
 4-3-3

COURSE DESCRIPTION:

This calculus-based course, designed for physical science majors, presents in depth an experimental and analytical study of mechanical oscillators, simple harmonic motion, waves, acoustics, resonance, electrostatics, electric fields, DC and AC circuits, magnetism, electromagnetic induction, electromagnetic waves, including the laws of Coulomb, Faraday, Gauss, Ampere, and Kirchhoff. The course will also cover the nature of light, and geometrical and physical optics, as applied to reflection, refraction, polarization, interference, and diffraction. This course is subject to a course fee. Refer to <http://mc3.edu/adm-fin-aid/paying/tuition/course-fees> for current rates.

REQUISITES:*Previous Course Requirements*

PHY 151 Principles of Physics I

MAT 189 Calculus With a Review of Functions II or MAT 190 Calculus and Analytic Geometry I

Previous or Concurrent Course Requirements

MAT 201 Calculus and Analytic Geometry II

LEARNING OUTCOMES

Upon successful completion of this course, the student will be able to:

LEARNING ACTIVITIES

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LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
8. Use experimental evidence to form tentative interpretations and conclusions.	Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments	Homework/Quiz Laboratory Report Section Examinations Final Exam
9. Assign meaningful measurement uncertainties and identify reasonable sources of experimental error.	Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials	

SEQUENCE OF TOPICS:

1. Simple Harmonic Motion
2. Waves and Harmonic Waves
3. Sound
4. Standing Waves
5. Electric Charge and Electric Fields
6. Gauss' Law
7. Electric Potential
8. Capacitance
9. Current and Resistance
10. DC Circuits
11. RC Circuits
12. Magnetism and Magnetic Fields
13. Charged Particles in Magnetic Fields
14. Ampere's Law
15. Faraday's Law of Electromagnetic Induction
16. Inductance
17. AC Circuits
18. Electromagnetic Waves and the Nature of Light
19. Mirrors and Lenses
20. Compound Optical Systems
21. Interference of Light
22. Diffraction of Light

SEQUENCE OF EXPERIMENTS:

1. Simple Harmonic Motion
2. Standing Waves and Resonance
3. Mapping Electric Fields
4. The Oscilloscope
5. Basic DC Circuits
6. RC Time Constant
7. Charged Particles in Magnetic Fields
8. Electromagnetic Induction
9. AC Circuits
10. Optics I – Mirrors and Lenses
11. Optics II – Compound Optical Systems
12. Interference of Light
13. Diffraction of Light
14. Atomic Spectra

LEARNING MATERIALS:

Textbook:

Serway & Jewett. (2010). *Physics for Scientists and Engineers*. 9th ed. Cengage Learning.

