

Course discipline/number/title: PHYS 1118: Introductory Physics II

A. CATALOG DESCRIPTION

1. Credits: 5
2. Hours/Week: 4 Lecture, 2 lab
3. Prerequisites (Course discipline/number): PHYS 1117
4. Other requirements: Or permission of Instructor
5. MnTC Goals (if any): Goal 3/Natural Sciences

B. COURSE DESCRIPTION: This course is the second semester of a two-semester algebra-based introduction to physics. The course covers the following topics: the first and second laws of thermodynamics, electrostatics, simple DC circuits, electric safety, AC circuits, magnetism, inductance, optics, relativity, and atomic and nuclear physics. Emphasis is on both conceptual learning and problem solving. The laboratory experience will provide the student with opportunities for discovery, measurement, report writing and data analysis. Or permission of instructor.

C. DATE LAST REVISED (Month, year): February, 2019

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Thermodynamics
 - a) Laws of Thermodynamics
 - b) Heat engines and the Carnot engine
2. Electricity and Magnetism
 - a) Electrostatics and Coulomb's Law
 - b) Electric potential and capacitance
 - c) DC Circuits: Ohm's Law, series and parallel, Kirchhoff's rules
 - d) Magnetism
 - e) Induced voltage and induction
 - f) AC circuits, transformers
3. Optics
 - a) Reflection and refraction of light
 - b) Mirrors and lenses
 - c) Wave optics and interference of light
4. Nuclear physics and radioactivity
5. Special relativity

The laboratory activities are used to enhance, correlate and demonstrate a variety of methods and equipment used in scientific inquiry and as verification of various scientific laws and theories. Laboratory measurement are obtained and recorded by students during the lab period. The results are analyzed, and certain specified calculations are required to demonstrate and verify related laws and relationships. Evaluation may consist of reports and/or lab packets and/or quizzes.

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Use common definitions of terms found in physics.
2. Explain and apply basic physics principles to their everyday lives.
3. Use critical thinking and problem-solving skills to evaluate physical systems and predict future behavior.

F. LEARNING OUTCOMES (MNTC):

Goal 3/Natural Sciences: The student will be able to:

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, student's laboratory experience in the collection of data, it's statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.

- G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Objective exams
 2. Lab exams
 3. Research papers
 4. Quizzes
 5. Written homework
 6. Online homework
 7. Small group projects
 8. Oral presentations
 9. Laboratory reports
- H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.
- I. SPECIAL INFORMATION (if any):
1. A scientific calculator is required