

1. Department, Course Number, and Course Title:

DEPARTMENT OF PHYSICS AND ASTRONOMY

PHYSICS 202 GENERAL PHYSICS (4)

2. Designation: Required Elective
Lower Division Upper Division

3. Course Description: Mechanical vibrations and sound, elementary thermodynamics.

4. Prerequisites: PHYS 201: MATH 207 (prerequisite or corequisite)

5. Text and Materials: Physics for Scientist and Engineers, 6th Ed. Serway R., Thomson, 2004
Phys 100/200 Supplement & Notes, Carr
Phys 202 Lab Manual

6. Course Objectives: Students will be introduced to the mechanics of continuous media via wave motion. Gravity is also discussed as a force responsible for the large scale motion of planets and galaxies. Thermodynamics expands the concept of the conservation of energy from the limited form discussed in Physics 201 (for conservative forces) to its broadest application to all forms of energy. The kinetic theory of gases shows how Newton's Laws of motion can be fruitfully applied on a microscopic scale. Entropy is a common concept in thermodynamics and statistical mechanics. Students will see that the many varied types of motion and transformations seen in the physical world can often be understood in terms of Newton's Laws of Motion.

Course Outcomes

- Students will learn about universal gravitation.
- Students will learn about fluid mechanics.
- Students will learn about oscillatory motion, such as waves on a string and sound waves, and wave phenomena , such as superposition of waves, energy transported by waves, and resonances.
- Students will be introduced to thermodynamics and its applications, such as thermometry, heat conduction, First Law of Thermodynamics, heat capacity, heat engines, and entropy.
- Students will be introduced to the microscopic Kinetic Theory of Gases. They will see the connection between topics discussed in thermodynamics and a microscopic theory that explains these topics based on Newtonian mechanics.

7. Topics Covered: (in Order of Presentation)

- Oscillatory motion (Ch. 13)
- Universal gravitation (Ch. 14)
- Fluid mechanics (Ch. 15)
- Wave motion (Ch. 16)
- Sound waves (Ch. 17)
- Superposition and standing waves (Ch. 18)
- Temperature, thermal expansion and Ideal Gases (Ch. 19)
- Heat and the First law of Thermodynamics (Ch. 20)
- The Kinetic Theory of Gases (Ch. 21)
- Heat engines, Entropy, and the Second law of Thermodynamics (Ch. 22)

8. Class Schedule: Number of Sessions per week: 2 lectures; 1 recitation; 1 laborator
Duration of each session: Lecture 1 hr, 15 min
Recitation 50 minutes
Laboratory 2 hours, 30 min

9. Contribution of course to meeting the professional component:

This course is part of the one year (48 quarter units) of Basic Mathematics and Science.
Science 4 units

10. Relationship of course to program objectives:

This course relates to the program objectives by contributing to the following measurable outcomes at the level indicated for all engineering graduates:

Knowledge outcomes:

- an ability to apply knowledge of mathematics, science, and engineering (abet a)
- knowledge of current events and societal contemporary issues -- non-engineering related. (abet j)
- knowledge of measurement techniques

Skill outcomes:

- an ability to design and conduct experiments as well as to analyze and interpret data (abet b)
- an ability to communicate effectively (abet g)
- an ability to think in a logical sequential process

Attitudes Outcome:

- a desire to be a flexible and adaptable team player (collaborative attitude)

11. Prepared by:

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01/2000
01/2006