

College of San Mateo
Official Course Outline

1. **COURSE ID:** PHYS 100 **TITLE:** Conceptual Physics
Units: 3.0 units **Hours/Semester:** 48.0-54.0 Lecture hours; and 96.0-108.0 Homework hours
Method of Grading: Letter Grade Only

2. **COURSE DESIGNATION:**
Degree Credit
Transfer credit: CSU; UC
AA/AS Degree Requirements:
 CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science
CSU GE:
 CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B1 - Physical Science
IGETC:
 IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: A: Physical Science

3. **COURSE DESCRIPTIONS:**
Catalog Description:
 Intended for the non-science major, this course is a survey of the more important phenomena of physics, with experimental demonstrations. Choose PHYS 210 or 250 if pursuing STEM majors.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
 Upon successful completion of this course, a student will meet the following outcomes:
 1. State Newton's Laws of Motion, explain the meaning of each, and identify applications of each.
 2. List and identify forms of energy and ways in which one form of energy can be transformed into another form.
 3. State the source of electric and magnetic forces and fields and describe phenomena relating to electricity and magnetism, including forces, flow of charge, and induction.
 4. Describe matter on the atomic scale.
 5. Describe the properties and nature of the different states of matter.
 6. Describe properties of different types of waves which may include light and sound.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
 Upon successful completion of this course, a student will be able to:
 1. Identify applications of specific physical principles.
 2. Explain physical phenomenon using appropriate physics terminology.
 3. Use physical laws to answer qualitative and quantitative questions.
 4. State the criteria under which a physical principle is valid.

6. **COURSE CONTENT:**
Lecture Content:
 Topics covered include the following: Mechanics; Properties of Matter; Thermodynamics; Vibrations and Waves; Electricity and Magnetism and Modern Physics

 The depth of each section will vary based on the instructor and may include the following:
 Mechanics: Kinematics, Newton's Laws, Momentum, Circular Motion, Energy, Rotation, Gravitation
 Properties of Matter: Atomic Structure, Solids, Liquids, Gases and Plasmas
 Thermodynamics: Temperature and Heat, Heat Transfer, Changes of State, Laws of Thermodynamics
 Vibrations and Waves: Mechanical Waves, Sound, Musical Sound, Light, Color, Reflection and Refraction
 Electricity and Magnetism: Electric Charge, Electrostatics, Electrical Current, Magnetism, Electromagnetic Induction, Electromagnetic Radiation
 Modern Physics: Photons, Quantum View of the Atom, Nuclei and Radioactivity, Fusion and Fission, Relativity

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**
 Typical methods of instruction may include:
 - A. Lecture

- B. Activity
- C. Discussion
- D. Other (Specify):

Lecture with demonstrations and in-class exercises to see real-world applications of physics principles. Critical thinking is developed in class by asking and answering questions like, "Why does Newton's First Law of Motion apply to this problem?" A focus is given to determining what physical principle or phenomenon applies in a given situation.

Out-of-class assignments include reading and homework.

Homework assignments are a mixture of qualitative and quantitative reasoning problems which require critical thinking to determine what physical phenomenon or phenomena are involved in the situation posed in the problem.

8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

Homework assignments containing short-answer questions (qualitative problems) and numerical problems (quantitative problems).

Reading Assignments:

Reading textbook chapters.

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Class Participation
- B. Exams/Tests
- C. Group Projects
- D. Homework
- E. Papers
- F. Projects
- G. Quizzes
- H. Physics 100, being a science course, requires critical thinking for Homework, Exams, and all other assignments. Homework and Exams also require problem solving.

10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

- A. Hewitt, Paul G.. *Conceptual Physics*, 12 ed. Addison-Wesley, 2015
- B. Cowell. *Conceptual Physics*, ed. OER Resource, 2007

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Course Originator: David Locke