PHYS 11 Course Outline as of Summer 2019

CATALOG INFORMATION

Dept and Nbr: PHYS 11 Title: CONCEPTUAL PHYSICS
Full Title: Conceptual Physics
Last Reviewed: 4/10/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	8	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 210.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
Introduction to the principles of classical and modern physics emphasizing basic concepts and topics such as mechanics, light, sound, quantum physics, electricity and magnetism, optics, and particle physics.

Prerequisites/Corequisites:
Course Completion of MATH 150 OR MATH 150B OR MATH 151 OR higher (MATH) or appropriate placement based on AB 705 mandates

Recommended Preparation:
Eligibility for ENGL 1A or equivalent

Limits on Enrollment:

Schedule of Classes Information:
Description: Introduction to the principles of classical and modern physics emphasizing basic concepts and topics such as mechanics, light, sound, quantum physics, electricity and magnetism, optics, and particle physics. (Grade or P/NP)
Prerequisites/Corequisites: Course Completion of MATH 150 OR MATH 150B OR MATH 151

OR higher (MATH) or appropriate placement based on AB 705 mandates
Recommended: Eligibility for ENGL 1A or equivalent
Limits on Enrollment:
Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 2011	
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B1	Physical Science	Fall 2011	
	B3	Laboratory Activity		
IGETC:	**Transfer Area**		Effective:	Inactive:
	5A	Physical Sciences	Fall 2011	
	5C	Fulfills Lab Requirement		

CSU Transfer:	Transferable	Effective:	Fall 2011	Inactive:
UC Transfer:	Transferable	Effective:	Fall 2011	Inactive:

CID:

Certificate/Major Applicable:
Major Applicable Course

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Explain the basic principles underlying the physics of motion, matter, heat, sound, electricity, magnetism, waves, light, atomic and nuclear theories.
2. Apply the scientific method and lab skills to investigate and evaluate physical phenomena.

Objectives:
Students will be able to:
1. Explain motion in one dimension, including free fall, and use Newton's Laws to solve problems related to motion.
2. Explain the states of matter and atomic and nuclear theory.
3. Define temperature, thermal energy, heat transfer, and explain the effect of thermal energy on materials.
4. Describe different types of waves, wave propagation, and wave interference.
5. Describe static electricity, the field associated with charges, and the force between various charges.
6. Interpret series and parallel circuits using Ohm's law.
7. Define magnetism, Ampere's Law, Faraday's law of induction, and their practical applications.
8. Explain full electromagnetic spectrum, visible optics/colors, and optical components and

systems.
9. Describe the concepts related to relativity, quantum physics, atomic physics, and nuclear physics.
10. Apply laboratory techniques including computer data acquisition and analysis tools to observe, measure and experiment with physical phenomena.

Topics and Scope:

I. Mechanics
- A. Linear motion
- B. Nonlinear motion
- C. Newton's laws of motion
- D. Momentum
- E. Energy
- F. Rotational motion
- G. Gravity
- H. Satellite motion

II. Properties of Matter
- A. Atomic nature of matter
- B. Solids
- C. Liquids
- D. Gases and plasmas

III. Heat
- A. Temperature, heat and expansion
- B. Heat transfer
- C. Change of state

IV. Sound
- A. Vibrations and waves
- B. Sound
- C. Musical sounds

V. Electricity and Magnetism
- A. Electrostatics
- B. Electric current
- C. Magnetism
- D. Electromagnetic induction

VI. Light
- A. Properties of light
- B. Color
- C. Reflection and refraction
- D. Light waves
- E. Light emission
- F. Light quanta

VII. Atomic and Nuclear Physics
- A. The atom
- B. Atomic nucleus and radioactivity
- C. Nuclear fission and fusion

VIII. Laboratory Skills
- A. Laboratory safety
- B. SI (System Internationale) and metric units
- C. Using calipers, stopwatches, metersticks, etc. to make measurements on mechanical systems
- D. Using computers and motion detectors to make measurements on mechanical systems

E. Using spreadsheets to record data and to calculate and analyze experimental results
F. Constructing graphs using computer graphing programs
G. Uncertainty and error analysis
H. Numerical and graphical analysis of data

Assignment:

Lecture-Related Assignments:
1. Reading assignments (approximately one textbook chapter per week)
2. Homework assignments (12-16)
3. Quizzes (5-16)
4. Exams (2-4)
5. Final exam

Lab-Related Assignments:
1. Laboratory readings and reports (12-17)
2. Laboratory exams (0-3)
3. Special project, such as demonstrations and video presentations (0-1)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Lab reports	Writing 10 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework assignments	Problem solving 10 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Exams, laboratory exams, quizzes, final exam	Exams 60 - 70%

Other: Includes any assessment tools that do not logically fit into the above categories.

Special project, class participation	Other Category 0 - 10%

Representative Textbooks and Materials:
Conceptual Physics. 12th ed. Hewitt, Paul. Addison Wesley. 2014 (classic)

Conceptual Physics Fundamentals. Hewitt, Paul. Addison Wesley. 2008 (classic)
Conceptual Physics Laboratory Manual. Hewitt, Paul. Addison Wesley. 2008 (classic)