

CATALOG INFORMATION

Dept and Nbr: PHYS 10                      Title: DESCRIPTIVE INTRO  
Full Title: Descriptive Introduction  
Last Reviewed: 4/19/2010

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	1	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

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:**  
Introductory survey of principles of classical and modern physics emphasizing basic concepts of physics while including some problem solving using elementary algebra.

**Prerequisites/Corequisites:**  
Math 150B or equivalent.

**Recommended Preparation:**  
Eligibility for ENGL 100 or ESL 100.

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: Introductory survey of principles of physics emphasizing basic concepts more than problem solving (Grade or P/NP)  
Prerequisites/Corequisites: Math 150B or equivalent.  
Recommended: Eligibility for ENGL 100 or ESL 100.  
Limits on Enrollment:  
Transfer Credit: CSU;UC.  
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>			<b>Effective:</b>	<b>Inactive:</b>
	C	Natural Sciences		Fall 1981	Fall 2015
<b>CSU GE:</b>	<b>Transfer Area</b>			<b>Effective:</b>	<b>Inactive:</b>
	B1	Physical Science		Fall 1981	Fall 2015
<b>IGETC:</b>	<b>Transfer Area</b>			<b>Effective:</b>	<b>Inactive:</b>
	5A	Physical Sciences		Fall 1981	Fall 2015
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1981	Inactive:	Fall 2015
<b>UC Transfer:</b>	Transferable	Effective:	Fall 1981	Inactive:	Fall 2015

**CID:**

**Certificate/Major Applicable:**

Not Certificate/Major Applicable

## **COURSE CONTENT**

### **Outcomes and Objectives:**

current & resistance.

Upon completion of this course, the student should be able to do no less than 3/4 of the following. (Note: Since there is insufficient time to cover all topics included in the textbook during a single semester, each instructor omits a few topics of their choice.)

1. Define speed; give examples of units for speed; distinguish between current & resistance.  
instantaneous & average speed.
2. Define acceleration & give examples of units for acceleration.
3. Solve problems involving distance, time, speed & constant acceleration
4. Describe the motion of freely falling objects & projectiles & the effect of air resistance on a freely falling object.
5. Distinguish between mass & weight
6. State Newton's laws of motion; give examples illustrating each; solve problems involving the second law.
7. Define momentum & impulse; explain and give examples of the relationship between momentum & impulse; explain what is meant by conservation of momentum & give examples.
8. Define the concepts of energy, work, kinetic energy, potential energy, & power.
9. State the principle of conservation of energy & give examples illustrating the principle.
10. Explain/define the concepts of rotational inertia, torque, center of gravity & angular momentum; solve problems involving balanced torques
11. Explain the concept of centripetal force & give & identify examples involving centripetal forces.
12. Explain what keeps planets, moons & satellites in orbit; explain how the sun & moon produce ocean tides.
13. Describe the structure of an atom, including the particles that make

- up an atom; distinguish between an atom & a molecule.
14. List the 4 states of matter & indicate what distinguishes each state from the other states.
  15. Define density & give units in which it can be expressed.
  16. Define pressure; give units in which it is expressed; distinguish between force & pressure.
  17. Explain the concept & cause of buoyant forces.
  18. State Archimedes', Pascal's & Bernoulli's principles & recognize & give examples of each.
  19. Indicate the relationships between pressure, volume & temperature in gases & solve problems involving these relationships.
  20. Distinguish between heat & temperature; give the freezing point & boiling point for water on the Celsius, Fahrenheit & Kelvin temperature scales.
  21. Explain the concepts of specific heat, latent heat of fusion & latent heat of vaporization; recognize & give examples involving specific heats & latent heats.
  22. Recognize & give examples of heat transfer by conduction, convection and radiation.
  23. Explain what a wave is; distinguish between a transverse & longitudinal wave; draw a sine wave & label its crest, trough, amplitude & wavelength; solve problems involving the velocity, frequency & wavelength of a wave.
  24. Explain interference of waves; distinguish between constructive & destructive interference; explain what a standing wave is & how it is produced.
  25. Describe the Doppler effect & give examples that illustrate it.
  26. Explain the phenomenon of resonance & give examples.
  27. Define/explain pitch, loudness & quality of a sound.
  28. Define the concepts of electrical charge, field, current & resistance
  29. Describe/explain charging by friction, by conduction or contact & by induction.
  30. Distinguish between series & parallel circuits; state Ohm's law; solve problems involving voltage, current & resistance.
  31. Explain the difference between a conductor, insulator, semiconductor & superconductor.
  32. Define the concept of a magnetic field; describe the magnetic field produced by a current carrying wire; describe the earth's magnetic field.
  33. Explain the operation of an electric motor.
  34. Explain Faraday's law of electromagnetic induction and explain the operation of an electric generator and a transformer.
  35. Describe/explain an electromagnetic wave and identify the order of the waves in the electromagnetic spectrum.
  36. State the primary colors of light and pigments; explain the additive and subtractive mixing of colors; identify complementary colors.
  37. State the law of reflection; distinguish between real & virtual images; describe the images formed by plane, convex and concave mirrors.
  38. Describe refraction & give and recognize examples of refraction; describe the images formed by converging and diverging lenses.
  39. Describe/explain diffraction, interference & polarization of light and recognize & give examples of each.

40. Describe/explain emission spectra, absorption spectra, fluorescence and phosphorescence.
41. Explain the operation of a laser.
42. Explain the concepts of quanta, quantization, & energy levels; describe the photoelectric effect.
43. Describe the structure of atomic nuclei; define/explain the concepts of isotopes, atomic number, mass number, radioactive decay & half-life
44. Describe the processes of nuclear fission & fusion and the operation of a fission reactor.
45. State the two postulates of the special theory of relativity; describe the relativistic effects of length contraction, time dilation, lack of agreement on simultaneity of events & the twin paradox.
46. State the principle of equivalence for the general theory of relativity; describe gravitational effects on light, time & space.

### **Topics and Scope:**

1. Mechanics.
  - a. linear motion
  - b. nonlinear motion
  - c. Newton's law of motion
  - d. momentum
  - e. energy
  - f. rotational motion
  - g. gravity
  - h. satellite motion
2. Properties of Matter.
  - a. atomic nature of matter
  - b. solids
  - c. liquids
  - d. gases and plasmas
3. Heat.
  - a. temperature, heat and expansion
  - b. heat transfer
  - c. change of state
4. Sound.
  - a. vibrations and waves
  - b. sound
  - c. musical sounds
5. Electricity and magnetism.
  - a. electrostatics
  - b. electric current
  - c. magnetism
  - d. electromagnetic induction
6. Light.
  - a. properties of light
  - b. color
  - c. reflection and refraction
  - d. light waves
  - e. light emission
  - f. light quanta
7. Atomic and Nuclear Physics.

- a. the atom and the quantum
  - b. atomic nucleus and radioactivity
  - c. nuclear fission and fusion
8. Relativity.
- a. special theory of relativity
  - b. general theory of relativity

### Assignment:

1. Homework: 12-16 Assignments.
2. Quizzes: 0-16 (depends on instructor)
3. Midterm exams: 0-4 (some instructors use weekly quizzes only)
4. Special projects: 0-1 (some instructors have an optional project)
5. Final exam.

### 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.

None

Writing  
0 - 0%

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

Homework problems, Quizzes, Exams

Problem solving  
0 - 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.

Multiple choice, True/false, Matching items, Completion, PHYSIC PROBLEMS TO SOLVE

Exams  
80 - 100%

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

SPECIAL PROJECT

Other Category  
0 - 17%

### Representative Textbooks and Materials:

CONCEPTUAL PHYSICS by Hewitt, 8th ed., Addison Wesley, 1998