PHYS 10 Course Outline as of Fall 2001

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:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 1981	Fall 2015
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B1	Physical Science	Fall 1981	Fall 2015
IGETC:	**Transfer Area**		Effective:	Inactive:
	5A	Physical Sciences	Fall 1981	Fall 2015

CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:	Fall 2015
UC Transfer:	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 & impluse; 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 & parallet 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 relection; 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, fluoresecence 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 theoryof 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