COURSE OUTLINE OF RECORD

Number: PHYS G120  TITLE: Algebra Based Physics: Mechanics

ORIGINATOR: James Almy  EFF TERM: Fall 2011
FORMERLY KNOWN AS:  DATE OF
OUTLINE/REVIEW: 03-20-2009
CROSS LISTED COURSE:  TOP NO: 1902.00
CID: PHYS 105

SEMESTER UNITS: 4.0
HRS LEC: 54.0  HRS LAB: 54.0  HRS OTHER: 0.0
CONTACT HRS TOTAL: 108.0
STUDY NON-CONTACT HRS RECOMMENDED: 108.0

CATALOG DESCRIPTION:
This is an algebra/trigonometry based physics course in mechanics, heat and sound. Topics studied
include force, motion, energy, heat transfer, effects of heat and the nature and properties of waves. Three
hours lecture and demonstration, three hours laboratory a week. UC credit limitations: PHYS G120,
PHYS G125 and PHYS G185, PHYS G280, PHYS G285 combined – maximum credit, 1 series. Deduct
credit for duplication of topics. C-ID: PHYS 105, 900S.

JUSTIFICATION FOR COURSE:

PREREQUISITES:
• GWC Math Placement Level of 70 or higher.
  or
• MATH G120: Trigonometry with a minimum grade of C or better
  or
• OCC Math Placement Level of 60 or higher.
  or
• MATH A120: Trigonometry with a minimum grade of C or better
  or
• CCC Math Placement Level of 80 or higher.
  or
• MATH C120: Trigonometry with a minimum grade of C or better

COREQUISITES:

ADVISORIES:

ASSIGNED DISCIPLINES:
Physics/Astronomy

MATERIAL FEE: Yes [ ] No [X] Amount: $0.00

CREDIT STATUS: Noncredit [ ] Credit - Degree Applicable [X] Credit - Not Degree Applicable [ ]

GRADING POLICY: Pass/No Pass [ ] Standard Letter [X] Not Graded [ ] Satisfactory Progress [ ]

OPEN ENTRY/OPEN EXIT: Yes [ ] No [X]

TRANSFER STATUS: CSU Transferable[ ] UC/CSU Transferable[X] Not Transferable[ ]

BASIC SKILLS STATUS: Yes [ ] No [X]  LEVELS BELOW TRANSFER: Not Applicable

CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable

NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course

OCCUPATIONAL (SAM) CODE: E
PHYS G120-Algebra Based Physics: Mechanics

REPEATABLE ACCORDING TO STATE GUIDELINES: No [X]  Yes [ ] NUMBER REPEATS:
REQUIRED FOR DEGREE OR CERTIFICATE: No [ ] Yes [X]
Geography(Associate in Arts for Transfer)
Kinesiology(Associate in Arts for Transfer)
Liberal Arts: Emphasis in Science(Associate in Arts)

GE AND TRANSFER REQUIREMENTS MET:
IGETC Area 5: Physical and Biological Sciences
   5A: Physical Science
   5C: Laboratory Activity
CSU GE Area B: Scientific Inquiry and Quantitative Reasoning
   B1 - Physical Science
   B3 - Laboratory Sciences

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. demonstrate problem solving skills involving constant acceleration equations and Newton's Laws.
2. solve problems involving energy and energy transfer and momentum.
3. apply algebra to solve problems involving fluid dynamics and thermodynamics.

COURSE OBJECTIVES:
1. solve problems involving constant acceleration equations.
2. solve problems involving Newton's Laws.
3. solve problems involving energy and energy transfer.
4. solve problems involving momentum.
5. solve problems involving waves.
6. solve problems involving fluid dynamics.
7. solve problems involving thermodynamics.

COURSE CONTENT:

LECTURE CONTENT:

A. Mechanics
   1. Scalars and Vectors
   2. Statics and Equilibrium
   3. Forces and Torques
   4. Kinematics (the description of motion)
      a. Position, velocity, acceleration
      b. Vector nature of these quantities
      c. Special case of motion with a constant acceleration
      d. Projectile motion
   5. Dynamics (the causes of motion)
      a. Newton's three laws of motion and the law of universal gravitation
      b. Energy (kinetic and potential) and its conservation
      c. Impulse and momentum and the principle of conservation of linear momentum
      d. Rotational motion
   6. Fluid Mechanics
      a. Archimedes principle
      b. Bernoulli's equation
      c. Pressure and Pascal's principle
B. Heat and Thermodynamics
   1. Measurement of temperature and the temperature scales
   2. Heat transfer and calorimeters
3. Heat as another form of energy; the first and second laws of thermodynamics
4. Ideal gases and their thermodynamic properties

C. Wave Motion and Sound
1. Types of waves (transverse, comperssional, etc.)
2. Properties of waves (velocity, frequency, wavelength, interference, diffraction)
3. Sound waves
   a. Resonance and musical instruments
   b. Doppler effect Lab Content:
      i. Collect data with appropriate sensors and significant figures.
      ii. Analyze data in graphical form.
      iii. Perform statistical error analysis.
   iv. Perform experiments involving positions, velocities, accelerations, and forces
   v. Perform experiments involving temperature, specific heat, and thermal expansion
   vi. Perform experiments involving oscillators, standing waves, and velocity of sound

LABORATORY CONTENT:
1. Collect data with appropriate sensors and significant figures.
2. Analyze data in graphical form.
3. Perform statistical error analysis.
4. Perform experiments involving positions, velocities, accelerations, and forces
5. Perform experiments involving temperature, specific heat, and thermal expansion.
6. Perform experiments involving oscillators, standing waves, and velocity of sound.

METHODS OF INSTRUCTION:
A. Lecture:
B. Lab:
C. Independent Study:

INSTRUCTIONAL TECHNIQUES:

COURSE ASSIGNMENTS:
Out-of-class Assignments

Students are encouraged to read some of the current popular scientific articles found in newspapers and popular scientific journals and magazines, and to watch some of the scientific programs on television. Discussion is encouraged.

Writing Assignments

Regular homework assignments are given which stress problem solving ability, and exams are given which test the students ability to solve such problems. The laboratory portion of the course is designed to give the student practice in making measurements and using equipment, and proficiency is determined by lab exams in which the student is expected to demonstrate the ability to use a piece of equipment to the instructor. In addition, students are expected to maintain lab notebooks which contain calculations and an analysis of each experiment.

Reading Assignments

Textbook

METHODS OF STUDENT EVALUATION:
Midterm Exam
Final Exam
Short Quizzes
Problem Solving Exercises
**Demonstration of Critical Thinking:**

Students will demonstrate the ability to think critically by analyzing given physical situations (reading word problems and interpreting them), applying the basic laws of physics toward the solution of such problems, deducing valid conclusions from their results, and then explaining these results in terms of non-mathematical ideas. From data collected in the lab, the students will be able to verify and "discover" the basic laws of physics, and use graphs to predict the results of other experiments. The student will then take these ideas and write a lab report which describes the results of his work, as well as answering questions related to the performance of the experiment.

**Required Writing, Problem Solving, Skills Demonstration:**

Regular homework assignments are given which stress problem solving ability, and exams are given which test the students ability to solve such problems. The laboratory portion of the course is designed to give the student practice in making measurements and using equipment, and proficiency is determined by lab exams in which the student is expected to demonstrate the ability to use a piece of equipment to the instructor. In addition, students are expected to maintain lab notebooks which contain calculations and an analysis of each experiment.

**TEXTS, READINGS, AND RESOURCES:**

**TextBooks:**

**LIBRARY:**

Adequate library resources include:

**Comments:**

**Attachments:**

[Attached Files]