I. GENERAL COURSE INFORMATION

Subject and Number: Physics 11
Descriptive Title: Descriptive Introduction to Physics
Course Disciplines: Physics/Astronomy
Division: Natural Sciences

Catalog Description:
This course utilizes lectures and demonstrations to present various principles of physics in a conceptual manner. Newton's Laws of motion and gravitation, momentum, work, energy, and heat will be presented. Other topics will be selected from properties of matter, fluids, sound, light, electricity and magnetism, atomic and modern physics, special and general relativity.

Conditions of Enrollment:
Recommended Preparation: English 1 or eligibility for English 1A or qualification by appropriate assessment

Course Length:	**X Full Term**	**Other (Specify number of weeks):**
Hours Lecture:	**3.00 hours per week**	**TBA**
Hours Laboratory:	**0 hours per week**	**TBA**
Course Units:	**3.00**	

Grading Method: Letter
Credit Status: Associate Degree Credit

Transfer CSU: X Effective Date: Prior to July 1992
Transfer UC: X Effective Date: Prior to July 1992

General Education:
El Camino College:
1 – Natural Sciences
Term: Other:

CSU GE:
B1 - Physical Science
Term: Other: Approved

IGETC:
5A - Physical Science without Lab
Term: Fall 1991 Other:

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. Given a description of a physical situation (floating ice cube, falling body,...) the student should be able to recognize the basic physical principles involved and explain how they are manifested in, and influence the behavior of, the situation.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at http://www.elcamino.edu/academics/slo/.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Explain Newton's Laws of Motion, the concepts of work and energy, and the concepts of impulse and momentum.
   - Written homework
2. Explain conceptually/qualitatively physical phenomena in terms of specific principles of physics.
   - Quizzes
3. Make qualitative predictions about the outcome of a natural physical event using specific principles of physics.
   - Essay exams

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	9	I	Newton's Laws of Motion A. Statics B. Constant acceleration C. Non-constant acceleration D. REPRESENTATIVE LIST OF DEMONSTRATIONS: 1. Inertia 2. Monkey-hunter 3. Drop shoot 4. Paradox of forces 5. Spool 6. Tricycle 7. Falling coffee-filters
Lecture	6	II	Conservation Laws A. Work and Energy B. Momentum C. REPRESENTATIVE LIST OF DEMONSTRATIONS: 1. Egg-sheet collision 2. Water rocket 3. Two carts with spring between and assorted masses 4. Air tracks 5. Fan cart 6. Faith in physics ball 7. Colliding balls

			8. Bouncing balls 9. Light bulb comparison 10. Elephant trebuchet
Lecture	6	III	Rotational Motion A. Centripetal Force and Acceleration B. Rotation C. Torque D. Angular Momentum E. REPRESENTATIVE LIST OF DEMONSTRATIONS: 1. Large wrench 2. Center of mass 3. Pipes with different moments of inertia 4. Hoop vs. disk down a plane 5. Water bucket 6. Coffee cup swing 7. Spinning chair 8. Spinning bicycle tires 9. Roller coaster with missing section
Lecture	3	IV	Gravity A. Laws of Gravity B. Satellite Motion C. REPRESENTATIVE LIST OF DEMONSTRATIONS: 1. Earth globe 2. Bathroom scale 3. Model space-shuttle
Lecture	6	V	Heat I. Temperature, Heat, and Expansion II. Heat Transfer III. Change of Phase IV. Thermodynamics V. REPRESENTATIVE LIST OF DEMONSTRATIONS: 1. Thermometers, expansion (pin breaker, sphere/ring) bimetallic strip, color change with temperature 2. Wood/pipe conduction, radiometer, photos taken with infrared sensitive film, thermos bottles, black body (razor blades), carbon rods 3. Boil water in student's hand, boil-freeze, evaporation cooling, salt, radiator cap 4. Drinking bird, engines, adiabatic compression igniter
Lecture	24	VI	The remainder of the course content is to be selected, at the instructor's discretion, from the following: A. Properties of Matter (Solids, Liquids, Gases & Plasmas) B. Vibrations, Mechanical Waves, Sound C. Electricity and Magnetism D. Light E. Atomic and Nuclear Physics F. Relativity G. REPRESENTATIVE LIST OF DEMONSTRATIONS: 1. Atomic chart, candle/inverted beaker, density, helium balloon, burning steel wool, toy blocks for area/volume,

			fish tank, large straw, crush can, barometer, Magdeburg spheres, surface tension, Bernoulli and equation of continuity 2. Springs with different spring constant, slinky, bell jar, Doppler ball, tuning forks, variable length pendulum, mechanical resonance, sound chart, video of Tacoma Narrows Bridge collapse, recorders 3. Rod and fur, bits of paper, electroscope, Van De Graaff generator, batteries, parallel and series circuits, digital multimeter, magnets, compass, dip needle, power supply, Lenz's Law, eddy currents, cow magnet, transformer 4. Diffraction gratings, spectrum tubes and power supplies, lasers, prism, assorted lenses, polarization, fish tank/milk powder, total internal reflection, variable index tank (sugar cubes on bottom) emission absorption line chart 5. Geiger Counter
Total Lecture Hours		54	
Total Laboratory Hours		0	
Total Hours		54	

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:
Multiple Choice and short answer questions

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:
1 . A mosquito has a collision with the windshield of a fast moving truck. The force on the mosquito is _____ the force on the truck, and the acceleration of the mosquito is _____ the acceleration of the truck.
a. Less than; less than
b. More than; more than
c. The same as; less than
d. The same as; more than

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:
1. A park ranger shoots a monkey hanging from a branch with a tranquilizing dart. The ranger aims directly at the monkey, not realizing that the dart will follow a parabolic path and thus fall below the monkey. The monkey, however, sees the dart leave the gun and immediately lets go of the branch. Will the monkey be hit by the dart? Does the velocity of the dart affect your answer, assuming it is great enough to travel the horizontal distance to the tree before hitting the ground? Defend your answer in a one-paragraph essay.

2. In a one-paragraph essay, explain why a boxer can punch a heavy bag for more than an hour without tiring, but will tire quickly when boxing with an opponent for a few minutes.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Essay exams
Other exams
Quizzes
Written homework
Class Performance
Homework Problems
Multiple Choice
Completion
Matching Items
True/False

V. INSTRUCTIONAL METHODS

Demonstration
Discussion
Group Activities
Lecture
Multimedia presentations

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

Study
Answer questions
Required reading
Written work

Estimated Independent Study Hours per Week: 6

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

P. Hewitt . Conceptual Physics. 12th ed. Pearson, 2014.

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

D. OTHER REQUIRED MATERIALS

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification

B. Requisite Skills

Requisite Skills

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
English 1	**Category**: Course. **Justification:** Students are required to read and comprehend a college-level textbook; therefore, the reading skills developed in English 1 will greatly enhance their chance for successfully completing this course.
Eligibility for English 1A or qualification by appropriate assessment	**Category**: Non-Course. **Justification:** Students are required to read and comprehend a college-level textbook; therefore, having these reading skills will greatly enhance their chance for successfully completing this course.

D. Recommended Skills

Recommended Skills
A student needs to have good reading skills to understand and interpret information provided in their textbooks. ENGL 1 - Summarize, analyze, evaluate and synthesize college-level texts.

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact

Course created by M. Feero on 02/01/1975.

BOARD APPROVAL DATE:

LAST BOARD APPROVAL DATE: 05/18/2020

Last Reviewed and/or Revised by: Zeke Murdock on 10/16/2019 **Date: 10/16/2019**
18403