CREDIT COURSE OUTLINE

I. COVER PAGE

(1) PHYS 2A	(2) GENERAL PHYSICS I	(3) 4
Number	Title	Units

(4)	Lecture / Lab Hours:			
	Total Course Hours			
		Total Lec hours:		72.00
		Total Lab hours:		33.00
		Total Contact hours:		108.00
	Lec will generate 0 hour(s) outside work.			
	Lab will generate 0 hour(s) outside work.			
(5)	Grading Basis:	Grading Scale Only		X
		Pass/No Pass option		
		Pass/No Pass only		
(6)	Advisories: *No defined advisories.*			
(7)	Pre-requisites(requires C grade or better): MATH 4A			
	Corequisites:			

(8)Classification:		
	Degree applicable:	X
	Non-degree applicable:	
	Basic skills:	
(9)RC	Fulfills AS/AA degree requirement: (area)	
	Competence in mathematics	
	General education category:	
	Area A Natural Sciences	
Major:		
Certificate of:		
Certificate in:		
(10)CSU	Baccalaureate:	X
(11)Repeatable: (A course may be repeated three times)		0

(12) Catalog Description:
The topics covered in this course include mechanics, properties of matter, heat, sound and waves.

II. COURSE OUTCOMES:

(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

Upon completion of this course, students will be able to:

I. Apply algebra and trigonometry to solve physical problems in topics such as such as:
- Kinematics
- Vector quantities
- Newton's Laws
- Conservation of energy and momentum
- Rotating bodies
- Gravity
- Oscillatory motion
- Mechanical waves
- Heat and Temperature
- Thermodynamics

II. Apply knowledge in the areas of mechanics, properties of matter, heat, sound and waves in other science related courses.

III. COURSE OBJECTIVES:

(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:

I. Improve mathematical skills through the process of applying mathematics to the physical world.
II. Learn fundamental laboratory techniques.
III. Experience the interaction between theory and experiment in scientific investigation.
IV. Learn to solve basic problems in classical mechanics.
V. Study important properties of matter.
VI. Study the laws of fluid mechanics.
VII. Learn to solve problems in oscillatory motion.
VIII. Learn the basic concepts of mechanical waves.

IV. COURSE OUTLINE:

Lecture Content:

A. The nature of Physics
1. Measurement systems and dimensional analysis
2. Scientific thinking and the application of experimental data

B. Kinematics
1. Position, velocity and acceleration in one and two dimensions
a. Free fall
b. Projectiles
2. Vectors and scalars
a. Addition and subtraction of vectors
b. Dot products

C. Dynamics/Newton's Laws
1. Newton's three laws of motion
2. Free body diagrams and net force calculations
3. Newton's law of universal gravity
4. Rotational motion

D. Statics
1. Net force calculations
2. Net torque calculations
3. Stress and strain

E. Conservation of Momentum and Energy
1. Potential and Kinetic energies
2. Work-Kinetic energy theorem
3.Energy conservation
4. Momentum conservation in one and two dimensions
5. Elastic and inelastic collisions

F. Structure and Properties of Matter
1. Fluid statics
a. Archimedes' Principle
b. Pascal's Principal
2. Fluid dynamics
a. Equation of continuity
b. Bernoulli's principle

G. Wave Motion
1. Oscillations
2. Simple harmonic motion and circular motion
3. Waves and SHM
4. Sound

I. Heat and Temperature
1. Temperature scales
a. Celsius, Fahrenheit and Kelvin scales
b. Heat as energy transfer
i. Joules and calories
ii. Convection, conduction and radiation

J. Thermodynamics
1. Thermal expansion
2. Calorimetry
3. Kinetic Theory of Gases

Lab Content:

A. Measurement
B. Constant velocity
C. Constant acceleration
D. Force tables and vector addition
E. Free body diagrams
F. Mass on the inclined plane
G. Conservation of energy
H. Conservation of momentum
I. Ballistic pendulum
J. Centripetal acceleration
K. Archimedes' Principle
L. Pendulum motion
M. Standing waves
N. Thermal expansion
O. Calorimetry

P. Kinetic theory of gas simulations

V. APPROPRIATE READINGS

Reading assignments may include but are not limited to the following:

I. Sample Text Title:

1. Recommended - John D. Cutnell, Kenneth W. Johnson *Laboratory Manual-Student Version,* ed. 6th -, 2004,

II. Other Readings

___ Global or international materials or concepts are appropriately included in this course
___ Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

A. Writing Check either 1 or 2 below			
X	***1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.***		
	2. Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.		
	a) essay exam(s)	X	d) written homework
	b) term or other paper(s)		e) reading reports
X	c) laboratory report(s)		f) other (specify)

Required assignments may include but are not limited to the following:
Laboratory reports that require technical writing skills and mathematical computations.

B. Problem Solving Computational or non-computational problem-solving demonstrations, including:			
X	a) exam(s)	X	d) laboratory reports
X	b) quizzes		e) field work
X	c) homework problems		f) other (specify):

Required assignments may include but are not limited to the following:
Homework problems that require mathematical computations, exams that require conceptual understanding and mathematical computations, and laboratory reports that require technical writing and mathematical computations.

C. Skill demonstrations, including:			
	a) class performance(s)		c) performance exams(s)
	b) field work		d) other (specify)

Required assignments may include but are not limited to the following:

D. Objective examinations including:			
X	a) multiple choice	X	d) completion
X	b) true/false	X	e) other (specify): computational problems
	c) matching items		

COURSE GRADE DETERMINATION:
Description/Explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in determining student final grades.

15% - 25% Homework 50%- 65% Exams 20% - 25% Lab Reports 10%– 15% Participation

VII. EDUCATIONAL MATERIALS

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

Validation Language Level (check where applicable):	College-Level Criteria Met YES	NO
Textbook	X	
Reference materials	X	
Instructor-prepared materials	X	
Audio-visual materials	X	

Indicate Method of evaluation:

Used readability formulae (grade level 10 or higher)	
Text is used in a college-level course	X
Used grading provided by publisher	
Other: (please explain; relate to Skills Levels)	

Computation Level (Eligible for MATH 101 level or higher where applicable)	X	
Content		
Breadth of ideas covered clearly meets college-level learning objectives of this course	X	
Presentation of content and/or exercises/projects:		
Requires a variety of problem-solving strategies including inductive and deductive reasoning.	X	
Requires independent thought and study	X	
Applies transferring knowledge and skills appropriately and efficiently to new situations or problems.	X	

List of Reading/Educational Materials

Recommended - John D. Cutnell, Kenneth W. Johnson *Laboratory Manual-Student Version,* ed. 6th -, 2004,

Comments:

	This course requires special or additional library materials (list attached).
X	This course requires special facilities: Physics Laboratory room

Attached Files:

BASIC SKILLS ADVISORIES PAGE The skills listed are those needed for eligibility for English 125, 126, and Math 101. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least three major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.

Check the appropriate spaces.

_____ Eligibility for Math 101 is advisory for the target course.
_____ Eligibility for English 126 is advisory for the target course.
_____ Eligibility for English 125 is advisory for the target course.

If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.

REQUISITES	
Subject Prerequisite -- MATH 4A TRIGONOMETRY	
• Provide and analyze graphs of trigonometric functions.	• Improve mathematical skills through the process of applying mathematics to the physical world.
Subject Advisory -- ENGL 1A READING AND COMPOSITION	
• Write a documented research paper of at least 1000 words that includes:	• Improve mathematical skills through the process of applying mathematics to the physical world.

ESTABLISHING PREREQUISITES OR COREQUISITES

Every prerequisite or corequisite requires content review plus justification of at least one of the seven kinds below. Prerequisite courses in communication and math outside of their disciplines require justification through statistical evidence. Kinds of justification that may establish a prerequisite are listed below.

Check one of the following that apply. Documentation may be attached.

1. _____ The prerequisite/corequisite is required by law or government regulations.
   Explain or cite regulation numbers:
2. _____ The health or safety of the students in this course requires the prerequisite.
   Justification: Indicate how this is so.
3. _____ The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.
   Justification: Indicate how this is so.
4. _____ The prerequisite is required in order for the course to be accepted for transfer to the UC or CSU systems.
   Justification: Indicate how this is so.
5. _____ Significant statistical evidence indicates that the absence of the prerequisite course is related to unsatisfactory performance in the target course.
   Justification: Cite the statistical evidence from the research.
6. _____ The prerequisite course is part of a sequence of courses within or across a discipline.
7. __X__ Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course:
   CSU Fresno, Cal Poly SLO, UCBerkeley