PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

APPLIED PHYSICS W/ LAB
PHY 1010

Class Hours: 3.0 **Credit Hours: 4.0**

Laboratory Hours: 3.0 **Date Revised: Fall 00**

Catalog Course Description:

This course provides an experimental-theoretical introduction to the basic concepts and principles of mechanics and heat. It covers vectors, Newton's laws of motion, force, torque, static equilibrium, work and energy, impulse and momentum, fluid statics, temperature and heat. Course includes 3 hours of lecture and 3 hours of laboratory applications.

Entry Level Standards:

Students must have college-level math skills.

Prerequisite:

MTH 1020 or MTH 1021

Textbook(s) and Other Reference Materials Basic to the Course:

Physics for Career Education, Sixth Edition by Ewen-Nelson-Schurter, Prentice Hall, 1999.
Physics 1010 Lab Manual

I. Week/Unit/Topic Basis:

Week	Topic
1	Lecture: Units and Measurements Lab: Units and Measurements
2	Lecture: Vector Addition Lab: Measurement and Density
3	Lecture: Accelerated Motion Lab: Vector Addition
4	Lecture: Forces in One Dimension Lab: Addition and Resolution of Concurrent Forces
5	Lecture: Newton's 3rd Law & Momentum Lab: The Acceleration of a Freely Falling Body
6	Lecture: Equilibrium of Concurrent Forces Lab: The Coefficient of Friction
7	Lecture: Work and Energy Lab: The Static Crane Bo

8	Lecture: Simple Machines Lab: Conservation of Energy
9	Lecture: Rotational Motion Lab: Simple Machines Demo
10	Lecture: Nonconcurrent Forces Lab: Centripetal Force
11	Lecture: Fluid Statics Lab: Moments of Parallel Forces
12	Lecture: Temperature and Heat Lab: Support Reactions
13	Lecture: Temperature and Heat Lab: Group Problems Session
14	Lecture: Gas Laws Lab: Group Problems Session
15	Lecture: Review Lab: Group Problems Session
16	COMPREHENSIVE FINAL EXAM

II. Course Objectives*:

A. Explain metric and American units and systems and perform various conversions between the two, (The gauges at work sites often use both types of units.). I.5, VI.2

B. Qualitatively describe the motion of a body and quantitatively calculate the necessary parameters by using equations of motion in a practical situation. VI.2-5

C. Calculate the work done by a force as well as energy calculations and conversion to heat(calories). VI.1-5

D. Explain different forms of energy and their conversion to each other as well as the Principle of Conservation of Energy in practical situations at work sites. I.5

E. Apply the laws of conservation of energy and momentum. I.5

F. Quantitatively calculate the parameters involved in the motion of a rotating object such as particle separators(centrifugal separating devices). VI.1-5

G. Quantitatively apply the laws of fluid pressure and density to measure the necessary parameters in a practical situation at work. VI.1-5

H. Make temperature measurements in different scales and convert and use them for heat and energy calculations with or without phase change. VI.1-5

I. Apply the equations for thermal expansion of solids, liquids, and gases. VI.1-5

J. Apply the conditions of static equilibrium to find the forces acting on an object in a given situation. I.5

K. Use the concept of torque of a force to analyze the static equilibrium of a rigid body. I.5

*Roman numerals after course objectives reference goals of the university parallel program.

III. Instructional Processes*:

Students will:

1. Learn in a cooperative mode by working in small groups with other students and exchanging ideas within each group (or sometimes collectively) while being coached by the instructor who provides assistance when needed. *Communication Outcome, Problem Solving and Decision Making Outcome, Active Learning Strategy*

2. Learn by being a problem solver rather than being lectured. *Problem Solving and Decision Making Outcome, Active Learning Strategy*

3. Explore and seek solutions to given problems that measures his/her level of accomplishment. *Problem Solving and Decision Making Outcome, Personal Development Outcome, Active Learning Strategy*

4. Visit industry sites or will be visited by a person from industry who applies the concepts being learned at his/her work site. *Transitional Strategy*

5. Gradually be given higher- and higher-level problems to promote his/her critical thinking ability. *Problem Solving and Decision Making Outcome, Personal Development Outcome*

6. Be tested more frequently for progress assessment while working independently on test problems. *Problem Solving and Decision Making Outcome*

7. Engage in learning processes such as projects, mentoring, apprenticeships, and/or research activities as time allows. *Communication Outcome, Active Learning Strategy, Transitional Strategy*

8. Use computers with appropriate software during class or lab as a boost to the learning process. *Information Literacy Outcome, Technological Literacy Outcome*

*Strategies and outcomes listed after instructional processes reference Pellissippi State' s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*:

Upon successful completion of this course, the student should be able to:

1. Apply the physics concepts to theoretical and practical situations. A-K

2. Estimate an unknown parameter in a given practical situation by using the physics principles involved. B,D,E,F,G,H,I

3. Recognize and guess the use of equipment and machines from the units used in their gauges. A

4. Understand energy calculations to estimate energy requirement and feasibility in a given situation. D,E, F

5. Perform necessary conversion between metric and non-metric units and systems. A

6. Apply the kinematics equations to describe motion. B,C

7. Apply the kinetics equation in force-motion situations. B,C

8. Calculate the work done, energy involved, and energy conversions in a given problem. D,E,F

9. Solve problems involving circular motion as well as torque, energy, and momentum calculations. E,F,G

10. Solve temperature and heat problems with or without phase change. I

11. Solve problems involving heat effect and thermal expansion in solids, liquids, and gases. J

12. Solve and analyze fluid pressure, air pressure, and density problems. H

13. Apply a vector approach where vector quantities are involved. K

14. Resolve a vector into two components graphically and analytically. K

15. Apply force and torque equilibrium concepts in solving simple rigid-body problems. K

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures:

Students are primarily evaluated on the basis of test/quiz type assessments and homework as outlined on the syllabus supplement distributed by the instructor. The following formula is used to evaluate the course grade: The number of tests vary from 5 to 7 at the discretion of the instructor. The percentages for quizzes and homework may vary depending on the instructor.

B. Laboratory Expectations:

Ten experiments are designed for the course. Each experiment requires a word-processed report which must be at least spell-checked. Other procedures for a standard lab report will be given by your instructor. No late lab report will be accepted and there are no lab make-ups.

C. Field Work:

Site Visits: The necessary site visits will be announced as the arrangements are made. Evaluation will be based on of attendance as well as the visit report.

D. Other Evaluation Methods:

N/A

E. Grading Scale:

Course Grade = (0.75) x (Theory Grade) + (0.25) x (Lab Grade)
Theory Grade = (0.80) x (Tests + Quizzes + H.W.) + (.20) x (Comp. Final)
Lab Grade = (the sum of report grades) / (the number of the reports)

91-100 A
87-91 B+

81-87	B
77-81	C+
70-77	C
60-70	D

VI. Policies:

Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.