PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

PHYSICS FOR TECHNOLOGY W/ LAB
PHY 1050

Class Hours: 2.0 **Credit Hours: 3.0**

Laboratory Hours: 3.0 **Date Revised: Spring 01**

Catalog Course Description:

A study of the principles of force, work, rate, resistance, energy, power, and force transformers and how these principles are applied in mechanical, fluid, electrical, and thermal energy systems. Course includes two hours of lecture and 3 hours of laboratory applications.

Entry Level Standards:

Automotive technology students registering for this course must have already taken their technical courses and must take this course in the last semester prior to graduation.

Prerequisites:

MTH 1010

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

P*hysics 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: Accelerated Motion Lab: Density Measurement
3	Lecture: Forces in One Dimension Lab: Coefficient of Friction
4	Lecture: Work and Energy Lab: Conservation of Energy
5	Lecture: Work and Energy, cont. Lab: Conservation of Energy, cont.
6	Lecture: Simple Machines Lab: Law of Lever
7	Lecture: Simple Machines, cont. Lab: Law of Lever, cont.

8	Lecture: Rotational Motion Lab: Equilibrium of Parallel Forces
9	lecture: Fluid Statics Lab: The Archimedes' Principle
10	Lecture: Temperature & Heat Lab: Specific Heat Measurement
11	Lecture: Gas Laws Lab: Pascal's Principle, Hydraulic Jack
12	Lecture: Direct Circuit Circuits Lab: Ohm's Law, Series and Parallel Resistors
13	Lecture: Sources Lab: Ohm's Law, Series and Parallel Resistors, cont.
14	Lecture: Magnetism Lab: Electric Motors
15	Lecture: Alternating Current
16	Final Exam

II. Course Objectives*:

A. Explain metric and American units and perform various conversions between the two(Gauges at work sites often use both types of units (example: tire pressure gage). 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. Quantitatively analyze force-motion relations in a practical situation, I.5, VI.2

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

E. Explain forms of energy, their conversions to each other, and apply the Principle of Conservation of Energy in practical situations at work sites. I.5

F. Apply the laws of conservation of energy. I.5

G. Quantitatively calculate the parameters involved in the motion of a rotating object such as flywheels and their effects. VI.1-5

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

I. Make temperature measurements in different scales and convert and use them for heat and energy calculations. VI.1-5

J. Apply the equations for thermal expansion of solids, liquids, and

gases. VI.1-5

K. Recognize and apply the lever law in simple machines such as transmissions. I.5

L. Apply the Ohm's Law to simple electric circuits to calculate voltage, current, and power for electrical devices. I.5, VI.1-5

M. Recognize, measure , and calculate the magnetic field in alternators and starters. VI.1-5

N. Distinguish the difference between AC and DC currents: their measurement and calculation(s). I.5, VI.1-5

O. Search for the solution to the assigned projects by examining the available software(s) and resources. VII

*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, Active Learning Strategy, Problem Solving and Decision Making Outcome*

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

3. Explore and seek the solutions to given problems (simple to more advanced) that measures the students' level of accomplishment. *Problem Solving and Decision Making Outcome*

4. Visit industry sites or will be visited by persons from industry who apply the concepts being learned at work. *Transitional Strategy*

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

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

7. Get engaged in learning processes such as projects, mentoring, apprenticeships, and research activities as time allows. *Communications Outcome, Personal Development Outcome, Transitional Strategy*

8. Use computers with appropriate software during class or lab as a boost to 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 figure out the use of equipment and machines from the units used in their gauges. A

4. Master 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, and F

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

10. Solve temperature and heat problems . I

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

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

13. Solve problems involving the Ohm's Law in simple circuits. L

14. Apply the formula for a solenoid and the Faraday's law for magnetic induction. M

15. Calculate and measure voltage, current, and power in simple AC circuits. N

*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:

Course Grade = (0.75) x (Theory Grade) + (0.25) x (Lab Grade)
Theory Grade = 0.80 (Tests + Quizzes + H.W.) + 0.20 (Comprehensive Final)
(80%) (10%) (10%)

The number of tests vary from 5 to 7 at the discretion of instructor. The quizzes and homework percentages 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.

Lab Grade = (the sum of report grades) / (the number of the reports)

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:

91-100 : A	77-81 : C+
87-91 : B+	70-77 : C
81-87 : B	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 meeting in order to receive credit for the course. Individual department/programs/disciplines, with the approval to the vice president to Academic and Student Affairs, may have requirements that are more stringent