

PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

CONCEPTS OF PHYSICS
PHYS 1300

Class Hours: 2.0

Credit Hours: 3.0

Laboratory Hours: 3.0

Revised: Summer 2003

Catalog Course Description:

A survey of physics concepts and content as applicable to the Tennessee K-8 curriculum standards and the National Science Education Standards. Instructional topics to include: mechanics, heat, electricity, magnetism, sound, and light . This course will only count toward the science requirement in Tennessee Technological University's K-8 teacher education programs.

Entry Level Standards:

Completion of DSP requirements; Must be interested in teaching K-8 science and applying to Tennessee Technological University's teacher education program.

Prerequisites:

Successful completion of one year of high school science. Students enrolled in the lecture must also participate in the accompanying laboratory hands-on activities and outside class assignments.

Textbook(s) and Other Course Materials:

Required Textbook: Hewitt, Paul G.; Suchocki, John; Hewitt, Leslie A.. Conceptual Physical Science, 2nd Edition. Addison Wesley Longman, 1999. Required Lab Manual: Hewitt, Paul G.; Suchocki, John; Hewitt, Leslie A.; Baird, Dean. Conceptual Physical Science Explorations: Laboratory Manual. Addison Wesley, 2003. Ancillary Materials: Current Article Resources (magazines, newspapers, webzines, etc..) Scientific Calculator (get a cheap one from Target, Wal-Mart, etc.) Web Access: This course will be a “ Web Enhanced” course utilizing various materials distributed by the teacher. Be prepared to have access to online learning resources.

I. Week/Unit/Topic Basis:

Week	Topic
1	Introduction to the Course / What is Science, Physics and Physical Science

2	Mechanics – Motion
3	Mechanics – Newton’ s Laws of Motion
4	Mechanics – Momentum and Energy
5	Mechanics – Gravity and Satellite Motion / Astronomy
6	Mechanics – Fluid Mechanics
7	Heat – Thermal Energy
8	Heat! – Heat Transfer and Thermodynamics
9	Electricity
10	Magnetism
11	Electricity Revisited
12	Sound
13	Light
14	Relationship between Physics and Chemistry
15	Review for Final Exam
16	Final Exam Period / Final Lab

II. Course Objectives*:

- A. Understand the fundamental concepts of Mechanics working with Newton’ s First law of Motion—The Law of Inertia; Newton’ s Second Law of Motion—Force and Acceleration; Newton’ s Third law of Motion—Action and Reaction; Momentum; Work and Energy; Gravity; and Projectile and Satellite Motion. I.5
- B. Understand the fundamental concepts of Heat—Thermal energy and Heat Transfer and Change of Phase. I.5
- C. Understand the fundamental Concepts of Electricity and Magnetism. I.5
- D. Understand the fundamental concepts of Waves—Sound and Light; Light and Color; Reflection and Refraction; Properties of Light. I.5
- E. Use appropriate computer technology and software to assemble, organize, and analyze scientific data, models, and information via experiment or web-based searches. I.2, III.3, 5, V.4, VI.1,4,5, VII.1-4

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

III. Instructional Processes*:

Students will:

1. Demonstrate problem-solving ability with emphasis on physics word problems and perform mathematical calculations. *Problem Solving and Decision Making Outcome, Numerical Literacy Outcome*
2. Use appropriate methods and equipment for making physical observation and measurements in a laboratory setting. *Technological Literacy Outcome, Numerical Literacy Outcome*
3. Collect data, generate and interpret chemical laboratory data using appropriate computer technology and/or software. *Technological Literacy Outcome, Numerical Literacy Outcome, Active Learning Strategy*
4. Locate, read, and interpret scientific information in printed media, including current relevant articles and professional articles. *Communication Outcome, Personal Development Outcome, Information Literacy Outcome*
5. Learn and use physics terms, name laws and principles of physics, understand and predict laboratory outcomes. *Communication Outcome, Problem Solving and Decision Making Outcome*
6. Understand and communicate the relevance of physics to their chosen field of work and society in general. *Transitional Strategy*
7. Correlate laboratory observations with theoretical concepts presented in class. *Active Learning Strategy*
8. Read, analyze, and evaluate scientific writings and experimental procedures. *Communication Outcome, Cultural Diversity Social Adaptation Outcome*
9. Collect, organize, interpret, and publicly present information concerning scientific events, subjects in society, and knowledge to students at PSTCC, and possibly in the community. *Communication Outcome*

*Strategies and outcomes listed after instructional processes reference Mississippi 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. Perform basic mathematical calculations pertaining to motion, force, acceleration, action and reaction, momentum, work and energy, gravity, projectiles, thermal energy, heat transfer, sound and light. A-E
2. Understand the fundamental physical concepts of the above topics. A-E

3. Differentiate among Newton' s Laws of Motion. A
4. Differentiate among thermal energy, heat transfer and change of phase. B
5. Understand the differences among the electrical currents and related laws. C
6. Understand magnetism and its laws. C
7. Understand and differentiate among wave types. D
8. Understand the basis of color. D
9. Understand the difference between reflection and refraction. D
10. Understand the properties of light. D

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

V. Evaluation:

A. Testing Procedures: 40% of grade

Unit tests: 28% FOUR (4) tests will be given. Tests will be multiple choice, short answer, fill-in-the-blank, but mainly discussion/problem solving.
Comprehensive final exam: 12% All students are required to take the final exam in order to receive credit for the course.

B. Laboratory Expectations: 40% of grade

1. Attendance is required for scheduled lab meetings. NOTE: if a student misses more than four lab sessions, the student receives an F for the course regardless of the grade for the lecture portion. Lab report sheets must be completed in INK.
2. A comprehensive lab final will be given on the last day of lab, worth 5% of grade. Each student will need to lead a new and original lab session that will be consistent with the Tennessee State Standards for an assigned age group, worth 10% of the grade. Each student will also have to redevelop a lesson or demonstration used in class by the teacher for a grade appropriate audience, worth 5% of the grade.
NOTE: This course will be activity/discussion-based; although “ lab” activities will mainly occur during the scheduled “ lab” section of the course, there will be activities during the “ lecture” section—there will be no makeup sessions for any activities missed.

C. Field Work: 20% of grade

1. The course will include several activities that necessitate the use of the Internet and various software programs that will be provided. Basic computer skills will be beneficial for completing these activities.
2. A journal or collection of news articles (minimum of 4) pertaining to physics. Short synopses of appropriate articles will be collected over the course of the semester—advance

notice will be given.

3. Homework Problems: You are strongly encouraged to work ALL of the assigned problems! They will be assigned to best prepare you in understanding the concepts and material. These will not always be graded assignments however you are expected to work them all out on your own.

D. Grading Scale:

90.0 - 100.0	A
87.5 - 89.9	B+
80.0 - 87.4	B
77.5 - 79.9	C+
70.0 - 77.4	C
60.0 - 69.9	D
Below 60.0	F

VI. Policies:

A. 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.

B. Academic Dishonesty:

Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions which may be imposed through the regular Pellissippi State procedures as a result of academic misconduct, the instructor has the authority to assign an F or a zero for the exercise or examination or to assign an F in the course.