PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

CONCEPTS OF PHYSICS
PHYS 1300

Class Hours: 2.0  Credit Hours: 3.0
Lab Hours: 3.0  Revised: Fall 2015

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 include mechanics, heat, electricity, magnetism, sound, and light. A course designed for students seeking the Associate of Science in Teaching degree; course focuses on the elementary education science concepts via the Next Generation of Science Standards.

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:

Two from the following list of courses: MATH 1410, MATH 1420; either MATH 1010 or MATH 1530

Textbook(s) and Other Course Materials:

Required Textbook: Hewitt, Paul G Conceptual Physical, tenth Edition. Addison Wesley Longman, 2006 (ISBN 0-8053-9375-7), approximate Price $143.35 new book and 108.25 used at Pellissippi’s bookstores. 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:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Newton’s First Law of Motion</strong> (Net Force, Equilibrium Rule, Support Force, Equilibrium of Moving Things)</td>
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<tr>
<td>2</td>
<td><strong>Newton’s Second Law</strong> (Force Causes Acceleration, Friction, Mass &amp; Weight, Newton’s Second Law of Motion, When Acceleration is g-Free Fall, Acceleration is Less Than g-non free Fall)</td>
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<tr>
<td>3</td>
<td><strong>Newton’s Third Law</strong> (Force and Interactions, Newton’s Third Law, Vector Momentum (momentum, Impulse, Impulse changes momentum, Conservation of momentum, Collisions))</td>
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</tbody>
</table>
Quiz 1


Quiz 2

6 Liquids (Pressure, Pressure in a Liquid, Buoyancy, Archimedes’ principle, What Makes an Objects Sink or Float, Float, Pascal’s Principle)

7 Temperature, Specific Heat Capacity, Thermal Expansion, Expansion of Water Heat Transfer (Conduction, Convection, Radiation, Cooling at Night by Radiation, Greenhouse Effect)

Quiz 3

8 Vibration of a pendulum, Wave Description, Wave Motion, Wave Speed, Transverse Waves, Longitudinal Waves, Doppler Effect

9 Electrical force, Electric Charges, Conservation of Charge, Coulomb’s Law, Conductor and Insulator, Charging, Charging Polarization, Electric Field, Electric Potential

Quiz 4

10 Flow of Charge, Electric Current, Voltage Sources, Electrical Resistance, Ohm’s Law, Direct Current and Alternative Current, Electric Power, Electric Circuits


Electromagnetic Induction, Faraday’s Law, Generator and Alternating Current, Power Production, Transformers

12 Electromagnetic Waves, Transparent materials, Opaque Materials Color, Selective reflection, Mixing Colored Light, Why the sky is Blue

Quiz 5

13 Reflection, Law of Reflection, Refraction, Cause of Refraction

14 Review

Quiz 6

15 Final Exam Period / Final Lab

II. Course Goals*:

The course will:

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

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. Expected Student Learning Outcomes*:

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

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

IV. Evaluation:

A. Testing Procedures:

Students are primarily evaluated on the basis of test/quiz type assessments and homework.

The following formula is used to evaluate the course grade:

Course Grade is broken down as:
40% (Tests Average) + 30%, (Lab Activities) + 10% (Power point Presentation.) +5% (H.W) + 15% (Comprehensive Final)
The lowest grade or missed test will be dropped
There will be no make up exam under any circumstances

B. Grading Scale:
V. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning 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 Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

C. Accommodations for disabilities:

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Disability Services (DS) in order to receive accommodations in this course. Disability Services may be contacted by sending email to disabilityservices@pstcc.edu, or by visiting Alexander 130. More information is available at http://www.pstcc.edu/sswd/.

D. Other Policies:

Safety:
To avoid injury, closed toe and heel shoes MUST be used during experiments.

Cell Phones:
Cell phone must be turned off during classes and Lab.