PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

CONCEPT OF PHYSICS
PHYS 1300

Class Hours: 2 **Credit Hours:** 3
Laboratory Hours: 3 **Revised:** Fall 2017

Catalog Course Description

A survey of Physics concepts and content as applicable to the Tennessee K-5 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.

Prerequisites

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

Corequisites: None

Textbook(s) and Other Course Materials

Hewitt, Paul G Conceptual Physical, Twelfth Edition, Pearson (ISBN 0-8053-9375-7), Current Article Resources (magazines, newspapers, webzines, etc.), and a scientific calculator**.** Web Access**:** This course is a "Web Enhanced" course utilizing various materials distributed by the teacher**.** The textbook is required**.** Students must also have access to online learning resources**.**

Week/Unit/Topic Basis

Week	Topics Covered in Group Activity	Test
1 **Mechanics**	**Chapter 2:** Newton's First Law of Motion (Net Force, Equilibrium Rule, Support Force, Equilibrium of Moving Things) **Chapter 3:** Linear Motion (Speed, Velocity, Acceleration, Free Fall)	
2 **Mechanics**	**Chapter 4:** Force Causes Acceleration, Friction, Mass & Weight, Newton's Second Law of Motion, When Acceleration is g (Free- fall), When Acceleration is Less Than g (Non-free-fall)	
3 **Mechanics**	**Chapter 5:** Newton's Third Law, Force and Interactions, Vectors **Chapter 6:** Momentum, Impulse, Impulse changes momentum, Conservation of momentum, Collisions	**Test 1 Chapters: 2, 3, & 4**
4 **Mechanics**	**Chapter 7:** Work, Power, Mechanical Energy, Potential Energy, Work-Energy theorem, Conservation of Energy, Machines	

Week	Topics Covered in Group Activity	Test
5 **Mechanics**	**Chapter 9:** Gravity (The Universal Law of Gravity, The Universal Gravitational Constant G, The Inverse-Square Law, Weight and Weightlessness, Ocean Tides, Gravitational Field) **Chapter 10:** Projectile (Projectile Motion, Fast Moving Projectiles)	**Test 2 Chapters: 5, 6, & 7**
6 **Liquids**	**Chapter 13:** Liquids (Pressure, Pressure in a Liquid, Buoyancy, Archimedes' principle, What Makes an Objects Sink or Float, Float, Pascal's Principle)	
7 **Heat**	**Chapter 15:** Temperature, Heat, Specific Heat Capacity, Thermal Expansion, Expansion of Water **Chapter 16:** Heat Transfer (Conduction, Convection, Radiation, Cooling at Night by Radiation, Greenhouse Effect)	**Test 3 Chapters: 9, 10, & 13**
8 **Sound**	**Chapter 19:** Vibration of a pendulum, Wave Description, Wave Motion, Wave Speed, Transverse Waves, Longitudinal Waves, Doppler Effect	
9 **Electricity**	**Chapter 22:** Electrical force, Electric Charges, Conservation of Charge, Coulomb's Law, Conductor and Insulator, Charging, Polarization, Electric Field, Electric Potential, Electric energy storage.	**Test 4 Chapters: 15, 16, & 19**
10 **Electricity**	**Chapter 23:** Flow of Charge, Electric Current, Voltage Sources, Electrical Resistance, Ohm's Law, Direct Current and Alternating Current, Electric Power, Speed and source of Electrons in a Circuit, Electric Circuits	
11 **Magnetism And Electromagnetic Induction**	**Chapter 24:** Magnetic Force, Magnetic Poles, Magnetic Field, Magnetic Domains, Electric Currents and Magnetic Fields, Magnetic Force on Moving Charged Particles, Magnetic Force on Current-Carrying Wires **Chapter 25:** Electromagnetic Induction, Faraday's Law, Generator and Alternating Current, Power Production, Transformers	**Test 5 Chapters: 22, 23, & 24**
12 **Light**	**Chapter 26:** Electromagnetic Waves, Transparent materials, Opaque Materials, **Chapter 27:** Color, Selective reflection, Mixing Colored Light, Why is the sky Blue?	
13 **Light**	**Chapter 28:** Reflection, Law of Reflection, Refraction, Cause of Refraction	**Test 6 Chapters: 25, 26, & 27**
14	**Review**	
15	**Final Exam**	

Course Goals*

NOTE: Roman numerals after course objectives reference the TBR general education goals**.**

The course will

A. Expand students' understanding of the basic concepts of Mechanics including Newton's Laws (Inertia, Force and Acceleration, Action and Reaction), Momentum, Work, Energy, Gravity, Projectile motion as well as Satellite Motion**.** I5
B. Expand students' understanding of the basic concepts of Thermal energy, Heat Transfer, and Phase Change**.** I.5
C. Expand students' understanding of the basic Concepts of Electricity and Magnetism.
D. Enhance students' understanding of the basic concepts of Waves, Sound, Light, Color, Reflection and Refraction phenomena, and 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
F. Develop an understanding of the importance of life-long learning and personal development. (V4 and V5)

Expected Student Learning Outcomes

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

The student will

1. Perform basic calculations pertaining to motion, force, acceleration, 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. Explain Newton's Laws of Motion. A
4. Differentiate between temperature change heat transfer and phase change heat transfer. B
5. Differentiate between direct current (DC) and alternating current (AC). C
6. Understand the cause of magnetism and the application of magnetic field. C
7. Be able to define different types and classification of waves. D
8. Explain the cause of light emitting in different colors. D
9. Define and explain the difference between reflection and refraction phenomena. D
10. Explain the properties of light**.** D

Evaluation

Tests: 55%; **Final Exam:** 15%

There will be 6 tests each of which include conceptual multiple-choice questions some of which requires writing explanations and reasoning.

Laboratory Activities: 20%

In-class Power Point Presentations: 10%

Course Grade = 0.55 (Tests) + **0.15** (Final Exam) + **0.20**(Lab) + **0.10**(Presentations)

Grading Scale: 91-100**:** A, 87-91**:** B+, 81-87**:** B, 77-81**:** C+, 70-77**:** C, and 60-70**:** D.

Policies

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.

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.

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 (http://www.pstcc.edu/sswd/) may be contacted via Disability Services email or by visiting Alexander 130.