PHYS 104 Syllabus – Fall 2018

Instructor: Dr. Benjamin Tayo
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Office: 302 Yates Hall
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Course Meting Time: 11:00 – 11:50 a.m.
Course Meting Days: M, T, W, Th
Course Meeting Room: Whitesitt Hall, Room 202
Text: *Physics for Scientists and Engineers*, 4th ed., by Giancoli, ISBN-13: 978-0-13-227559-0
Office hours: M (8 – 9, 12 – 4); T (8 – 9); W (8 – 9); TH (8 – 9, 12 – 4), F (8 – 12) or by appointment
Course delivery method: face-to-face

This course is also intended for partial fulfillment of the Pitt State Pathway Curriculum.

Pitt State Pathway Mission Statement: The *Pitt State Pathway* curriculum serves as the heart of the university education by fostering interdisciplinary competencies that typify the educated person. It is designed to facilitate the development of key proficiencies including communication and information literacy. The *Pitt State Pathway* curriculum provides a transformational experience that challenges students to think creatively and critically, and to immerse themselves in the productive examination of humans in their global setting. By encouraging the development of skills that promote life-long learning, the *Pitt State Pathway* fosters a sense of personal responsibility, an appreciation of diversity, and an understanding of interconnectedness in our truly global society.

Essential Study to be covered in this course: Natural World within a Global Context
Biological, physical, and chemical systems form the context for life. Students need to understand how these systems work, how these change naturally, and how these can change as a result of human activities. The implications of these changes are essential for long-term decision-making. In this course we will:

Analyze physical and chemical systems;
Evaluate the implications of changes that result from interactions between natural and human systems.

Companion Element to be covered in this course: Scientific Inquiry
The scientific method is the systematic approach to understanding the world around us. Through experimentation and hypothesis testing, students will apply analytical skills and appropriate methods of scientific inquiry (i.e. qualitative and quantitative) to solve a variety of research questions. In this course we will:
Compose appropriate research questions and hypothesis, drawing from experts, reliable sources, or previously collected data.
Collect, synthesize, and analyze data from multiple sources;
Draw logical conclusions, assessing for gaps and weaknesses, and addressing potential consequences and implications
Communicate results using appropriate delivery methods or formats.

The **Learning Outcome** for Natural World in a Global Context is:

Students will explore global systems conscientiously.

The **Learning Outcome** for Scientific Inquiry is:

Students will analyze data logically.

Course Description: 4 hours. Calculus-based mechanics, heat, sound, kinematics, statics, dynamics, thermodynamics, pressure and rotary/wave motion. For science, engineering, and engineering technology students.

Prerequisite: MATH 150 Calculus I. Concurrent enrollment required in PHYS 130 Elementary Physics Laboratory I. Closed to students with credit in PHYS 100 College Physics I.

Course Objectives:

Natural World within the Global Context: Level of Student Learning = Milestone II
Analyzes physical and chemical processes and how human activities alter them

Scientific Inquiry: Level of Student Learning = Milestone II

Upon completion of the course, you should be able to:

- Analyze problems in physics and evaluate scientific data using numerical methods embedded in EXCEL software
- Employ Newton's three laws of motion to solve calculus-based translational and rotational dynamics problems.
- Evaluate conservation of energy and momentum in dynamics problems.
- Examine Pascal's, Archimedes' and Bernoulli's principles in problems involving fluids.
- Analyze the basic properties and be able to solve calculus-based problems involving simple harmonic motion, mechanical waves and sound.
- Interpret the laws of thermodynamics to solve problems involving thermal equilibrium, heat transfer, heat engines and refrigerators.

Student will apply the scientific methods to a problem. Student will compare tools of analysis and communicate results

Certain fundamental skills will be used throughout this course and the associated laboratory course. As a result, you should attain some degree of mastery in each of the following areas:

1. Vocabulary and basic mathematical concepts of physics, rates of change, vectors, and orders of magnitude.

2. SI units, both fundamental and derived, and their conversions.

3. Graphing data and mathematical relations: producing, interpreting, and using math as a tool.

4. Modeling and predicting: Develop and improve abilities for abstraction, analysis, and pictorial intuition.

5. Problem solving in physics using calculus.

6. Scientific method: Examine methods and insights by which knowledge has grown in physics.

7. Empirical techniques: Gather and analyze data, synthesize, observe, and draw conclusions.

8. Applications to real life situations: Comprehend physical components and their relation to the universe.

9. Organizing principles of physics: laws, methods, and history of thought in the sciences.

10. A humanistic and integrated view of man, science, society, and nature as exemplified by physics.

Methods of Assessment:

Students, on homework, exams, and in-class work, will *describe, explain and analyze,* items, principles, and processes related to the student outcomes. (Milestone II)

Attendance Policy: Regular attendance is required. Class attendance will be taken at the beginning of the class.

Disabilities: If you have any physical or learning disabilities, please contact the Center for Student Accommodations (CSA) at csa@pitttstate.edu.

Cell Phone Policy: Use of cell phone during class lecture is prohibited. Any student attempting to use a cell phone or any other electronic devices as aids during the exam will risk being suspended from the course, in addition to disciplinary actions that could be taken for academic misconduct.

Plagiarism and Cheating:
Plagiarism and cheating are serious offenses and may be punished by failure on the exam, paper or project, failure in the course, and/or expulsion from the University.
For more information refer to the PSU Code of Student Rights and Responsibilities: Article 30, Academic Misconduct at http://www.pittstate.edu/audiences/current-students/policies/rights-and-responsibilities/academic-misconduct.dot
During exams, please arrange to sit with at least one empty seat between two students. Basic calculators are allowed.

Here are supplementary syllabus notes available to all PSU students.

Course Schedule

Unit 1
Chapter 1: Preliminaries, measurements, uncertainty, units, significant figures
Chapter 2: One-dimensional Kinematics
Chapter 3: Two-dimensional Kinematics, projectile motion
Chapter 4: Dynamics, Newton's Laws of Motion
Unit 1 Test (September 24, 2018 – tentative)
Unit 2
Chapter 5: Circular Motion
Chapter 6: Newtonian Gravitation
Chapter 7: Work and Energy
Chapter 8: Conservation of Energy
Chapter 9: Linear Momentum, Momentum Conservation, Center of Mass
Chapter 10: Rotational Motion
Chapter 11: Angular Momentum, Moment of Inertia, Torque
Unit 2 Test (October 22, 2018 – tentative)
Unit 3
Chapter 12: Statics, Elasticity
Chapter 13: Fluids, Pressure, Pascal's Principle, Archimedes' Principle, Bernoulli's principle
Chapter 14: Simple Harmonic Motion, simple pendulum
Chapter 15: Waves

Chapter 16: Sound intensity, beats, Doppler Effect
Unit 3 Test (November 26, 2018 – tentative)
Unit 4
Chapter 17: Thermal Equilibrium, Temperature, Ideal Gas Laws
Chapter 18: Kinetic Theory of Gases, Molecular Speeds
Chapter 19: Heat and First Law, Specific heat, Latent heat, calorimetry, heat transfer
Chapter 20*: Second Law, Heat Engines (will be covered if time permits)
Final Comprehensive Examination (December 10, 2018, 11:00 – 1:50 PM)

Methods of Assessment of Student Learning
Three unit tests (UT) during the semester, homework (HW), weekly canvas quizzes (CQ), and a comprehensive final exam (FE) at the end of the semester.

Grading: Grades will be based on

- Attendance (AT) = 5%
- Homework (HW) = 25%
- Canvas Quiz (CQ) = 10%
- Unit Tests (UT) = 36%
- Comprehensive Final Exam (FE) = 24 %

Percent	Grade
90 - 100	A
80 - 89	B
70 - 79	C
60 - 69	D
< 60	F

Homework Policy

1. Homework sets will be assigned periodically. For homework submitted after due date, grades will be decreased by 20% for each day late.

2. Homework to be turned in must be neat, legible, stapled, and on one side of the paper only. As a general practice, work each homework problem on a scratch paper and recopy when thought to be correct and complete. All homework problems will be graded; however, **the instructor reserves the right to give zero credit for any problem that does not appear neat, legible, and easy to follow.**

3. For each quantitative homework problem:

   a) Start each problem on a separate page.
   b) Paraphrase the problem to be solved.
   c) State all given and pertinent data.
   d) List all pertinent formulas or laws needed to solve the problem.
   e) Solve the equations specified above.
   f) Label and box your final answer. All numerical calculations, unless otherwise stated must be reported in 3 decimal places
   g) **The instructor reserves the right to give zero credit to a problem if any one of these steps are not followed.**

4. Partial credit will be given for each worked problem.