

## Administrative Master Syllabus

### Course Information

<b>Course Title</b>	College Physics I
<b>Course Prefix, Num. and Title</b>	PHYS 1401
<b>Division</b>	Math & Physical Sciences
<b>Department</b>	Physics & Engineering
<b>Course Type</b>	Academic WCJC Core Course
<b>Course Catalog Description</b>	Fundamental principles of physics using algebra and trigonometry; the principles and applications of classical mechanics and thermodynamics, including harmonic motion, mechanical waves and sound, physical systems, Newton's Laws of Motion, and gravitation and other fundamental forces; with emphasis on problem solving. Laboratory activities will reinforce these concepts.
<b>Pre-Requisites</b>	MATH 1314 and MATH 1316 or MATH 2412
<b>Co-Requisites</b>	None

### Semester Credit Hours

<b>Total Semester Credit Hours (SCH): Lecture Hours:</b>	4:3:2
<b>Lab/Other Hours</b>	
<b>Equated Pay Hours</b>	4.2
<b>Lab/Other Hours Breakdown: Lab Hours</b>	2
<b>Lab/Other Hours Breakdown: Clinical Hours</b>	0
<b>Lab/Other Hours Breakdown: Practicum Hours</b>	0
<b>Other Hours Breakdown</b>	0

### Approval Signatures

Title	Signature	Date
<b>Department Head:</b>	<i>Rocio Doherty</i>	12/14/23
<b>Division Chair:</b>		12-15-2023
<b>VPI:</b>		

## Additional Course Information

**Topical Outline:** Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

Lecture Outline:

Syllabus and Class Introduction

- CH 1 Introduction and Mathematical Concepts
- CH 2 Kinematics in One Dimension
- CH 3 Kinematics in Two Dimensions
- CH 4 Forces and Newton's Law of Motion
- CH 5 Dynamics of Uniform Circular Motion
- CH 6 Work and Energy
- CH 7 Impulse and Momentum
- CH 8 Rotational Kinematics
- CH 9 Rotational Dynamics
- CH 10 Simple Harmonic Motion and Elasticity
- CH 11 Fluids
- CH 12 Temperature and Heat
- CH 13 The Transfer of Heat
- CH 14 Ideal Gas Law and Kinetic Theory
- CH 15 Thermodynamics
- CH 16 Waves and Sound
- CH 17 The Principle of Linear Superposition and Interference Phenomena

Laboratory Outline: Each offering of this course must include 11-13 experiments selected from the below list.

Syllabus and Lab Orientation

1. Measurement and Error
  2. Graph Matching
  3. Cart on a Ramp
  4. Picket Fence Free Fall
  5. Force Table
  6. Atwood's Machine
  7. Coefficients of Friction
  8. Uniform Circular Motion
  9. Conservation of Energy
  10. Momentum, Energy and Collisions
  11. Rotational Inertia of a Disk
  12. Simple Pendulum
  13. Buoyant Force
  14. Calorimetry
  15. Behavior of a Gas
  16. Speed of Sound
- Projectile Motion Demo (optional)

## Course Learning Outcomes:

### Learning Outcomes – Upon successful completion of this course, students will:

#### Lecture:

1. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration.
2. Apply Newton's laws to physical problems including gravity.
3. Solve problems using principles of energy.
4. Use principles of impulse and linear momentum to solve problems.
5. Solve problems in rotational kinematics and dynamics, including the determination of the location of the center of mass and center of rotation for rigid bodies in motion.
6. Solve problems involving rotational and linear motion.
7. Describe the components of a wave and relate those components to mechanical vibrations, sound, and decibel level.
8. Demonstrate an understanding of equilibrium, including the different types of equilibrium.
9. Discuss simple harmonic motion and its application to quantitative problems or qualitative questions.
10. Solve problems using the principles of heat and thermodynamics.
11. Solve basic fluid mechanics problems.

#### Laboratory:

1. Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment.
2. Record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports.
3. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration.
4. Apply Newton's laws to physical problems including gravity.
5. Solve problems using principles of energy.
6. Describe the components of a wave and relate those components to mechanical vibrations, sound, and decibel level.
7. Use principles of impulse and linear momentum to solve problems.
8. Solve problems in rotational kinematics and dynamics, including the determination of the location of the center of mass and center of rotation for rigid bodies in motion.
9. Solve problems involving rotational and linear motion.
10. Demonstrate an understanding of equilibrium, including the different types of equilibrium.
11. Discuss simple harmonic motion and its application to quantitative problems or qualitative questions.
12. Solve problems using the principles of heat and thermodynamics.
13. Solve basic fluid mechanics problems

### Methods of Assessment:

Outcomes assessed by:

Final exam, tests, quizzes, class work and homework assignments

Lab outcomes assessed by:

Lab exam and lab reports

**Required text(s), optional text(s) and/or materials to be supplied by the student:**

James S. Walker. *Modified Mastering Physics* with Pearson e-text + Standalone Access Card -- for Physics, 5th Edition. (ISBN: 978-0-1340-1972-7)

*College Physics Lab Manual, 1st Edition*, Wharton County Junior College; (ISBN: 978-1-5339-0863-6)  
Scientific calculator (optional at Instructor's discretion)

Students must have computer access to the WCJC website, their WCJC student email and online accounts. WCJC has open computer labs, with internet access, on all campuses for students to use.

**Suggested Course Maximum:**

36

**List any specific or physical requirements beyond a typical classroom required to teach the course.**

Physics laboratory classroom required for the lab component of the course

**Course Requirements/Grading System:** Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

Lecture Average:

Exam Average (3-4 exams)	30-55%
Other (homework, quizzes, projects, attendance, class work, etc)	0-25%
Laboratory Average (based on lab avg below)	25%
Final Exam (includes at least 50% comprehensive material)	20-25%
	100% course total

Laboratory Average\*:

Lab Reports	20-75%
Other (lab notebook, pre-lab assignments, quizzes, etc)	20-80%
Lab exam	5-25%
	100% lab total

\*Department policy: A student must earn a 60% laboratory grade or greater to pass the course.

The overall course grade is assigned as specified by the college:

A = 90–100  
B = 80–89  
C = 70–79  
D = 60–69  
F = below 60

### **Curriculum Checklist:**

- Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.
- Administrative WCJC Core Course** – Attach the Core Curriculum Review Forms
  - Critical Thinking
  - Communication
  - Empirical & Quantitative Skills
  - Teamwork
  - Social Responsibility
  - Personal Responsibility
- WECM Course** – If needed, revise the Program SCANS Matrix and Competencies Checklist

### Core Curriculum Review Form

**Foundational Component Area:** Core 030: Life & Physical Science

**Course Prefix & Suffix:** PHYS 1401

**Core Objective:**

**Critical Thinking Skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information

**Student Learning Outcome Supporting Core Objective:**

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	(Lecture SLO #4) Use principles of impulse and linear momentum to solve problems.	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	(Laboratory SLO #1) Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment.	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
Choose a SLO status.	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.

## Core Curriculum Review Form

**Foundational Component Area:** Core 030: Life & Physical Science

**Course Prefix & Suffix:** PHYS 1401

**Core Objective:**

**Communication Skills**—to include effective development, interpretation, and expression of ideas through written, oral and visual communication

### Student Learning Outcome Supporting Core Objective:

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	(Lecture SLO #4) Use principles of impulse and linear momentum to solve problems.	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	(Laboratory SLO #2) Record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly in written reports.	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
Choose a SLO status.	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.

### Core Curriculum Review Form

**Foundational Component Area:** Core 030: Life & Physical Science

**Course Prefix & Suffix:** PHYS 1401

**Core Objective:**

**Empirical and Quantitative Skills**—to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

**Student Learning Outcome Supporting Core Objective:**

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	(Lecture SLO #4) Use principles of impulse and linear momentum to solve problems.	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	(Laboratory SLO #1) Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment.	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
Choose a SLO status.	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.



## Core Curriculum Review Form

**Foundational Component Area:** Core 030: Life & Physical Science

**Course Prefix & Suffix:** PHYS 1401

**Core Objective:**

**Teamwork**—to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

### Student Learning Outcome Supporting Core Objective:

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	(Lecture SLO #4) Use principles of impulse and linear momentum to solve problems.	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	(Laboratory SLO #1) Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment.	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
Choose a SLO status.	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.