

Course Information

Course Title	College Physics I
Course Prefix, Num. and Title	PHYS 1401
Division	Math & Physical Sciences
Department	Physics & Engineering
Course Type	Academic WCJC Core Course
Course Catalog Description	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.
Pre-Requisites	MATH 1314 AND MATH 1316 or MATH 2312
Co-Requisites	None

Semester Credit Hours

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

Approval Signatures

Title	Signature	Date
Prepared by:		
Department Head:		
Division Chair:		
Dean/VPI:		
Approved by CIR:		

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:

12. Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment.
13. Record experimental work completely and accurately, and communicate experimental results clearly in written reports.

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:

Cutnell & Johnson (& Young & Stadler), *Physics*, 11th Edition, Wiley (required)

College Physics Lab Manual (required)

Scientific calculator (optional at Instructor's discretion)

Students must have computer access to the 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 in order 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

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	Use principles of impulse and linear momentum to solve problems. (AMS SLO #4)	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment. (AMS SLO #12)	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	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.

Date: [Click here to enter date.](#)

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	Use principles of impulse and linear momentum to solve problems. (AMS SLO #4)	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Record experimental work completely and accurately, and communicate experimental results clearly in written reports. (AMS SLO #13)	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	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.

Date: [Click here to enter date.](#)



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	Use principles of impulse and linear momentum to solve problems. (AMS SLO #4)	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment. (AMS SLO #12)	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
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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	Use principles of impulse and linear momentum to solve problems. (AMS SLO #4)	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment. (AMS SLO #12)	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
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Date: [Click here to enter date.](#)