



# PENSACOLA STATE COLLEGE

## SYLLABUS

Physics with Calculus I

PHY2048-P1264

Spring 2026, Session A

**Instructor:** Dr. R. Evan McClellan

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**Last Date of Drop/Add:** January 15, 2026

**Last Date for Student to Withdraw:** April 6, 2026

**Final Exam Date:** TBD

**Class Meeting Time:** Monday, Wednesday | 11:00 AM - 12:50 PM

**Class Location:** Pensacola Campus, Building 17, Room 1776

**Corequisites:** MAC 2312, PHY 2048L

**Course Description:** This calculus-based course serves as the first in a two-part series, covering topics like kinematics, dynamics, energy, momentum, rotational motion, fluid dynamics, oscillatory motion, and waves. Designed for science and engineering majors, the course integrates critical thinking, analytical skills, and real-world applications.

**Credit Hours:** 4 credit hours

**Semesters Offered:** Fall, Spring

**Course Designations:** College Transfer. Meets AA General Education Core, Natural Sciences (Physical Sciences) requirement.

**General Education Core Course Standard: Per Florida Statute 1007.25,** "Natural science courses must afford students the ability to critically examine and evaluate the principles of the scientific method, model construction, and use the scientific method to explain natural experiences and phenomena."

**Required Textbooks and Instructional Materials:** University Physics; Ling, Sanny, Moebis; 9781938168277; VOL 1; Openstax; 2016 (Ch. 1-17), University Physics; Ling, Sanny, Moebis; 1938168275; VOL 2; Openstax; 2016 (Ch. 1-4)

### **Zero Textbook Cost (ZTC)**

The educational materials used in this course, including textbooks and ancillary materials, are intended for educational purposes only. All opinions represent those of the author(s) and not necessarily those of Pensacola State College, or the instructor.

**Supplemental Materials:** Scientific or Graphing Calculator

### **Course Learning Outcomes:**

1. Describe the motion of objects moving at constant velocity or constant acceleration.
2. Find the magnitude and direction of the resultant vector obtained by adding several vectors.
3. Find the horizontal range of a projectile.

4. Write Newton's Laws of motion and Gravitation.
5. Describe and understand the concept of inertia.
6. Explain the difference between static and kinetic friction.
7. Draw a complete free-body diagram for a typical mechanics problem.
8. Apply Newton's 2nd Law to analyze the motion of an object along an inclined plane.
9. State and know how to apply the Work-Energy Theorem.
10. Compute the kinetic energy of a moving body.
11. Find the gravitational potential energy of a body near the surface of the Earth.
12. Apply the Law of Conservation of Energy.
13. Locate the center of mass of a rigid body.
14. Find the linear momentum of a moving body.
15. Write down the linear impulse-momentum principle.
16. Apply the law of conservation of linear momentum to analyze elastic, inelastic and plastic collisions of particles.
17. Compute the thrust of a rocket.
18. Find the angular velocity, angular acceleration and centripetal force acting on a body moving in a circular path.
19. Apply Kepler's Laws and conservation of angular momentum to describe the motion of a comet.
20. Understand the concepts of torque and moment arm.
21. Find the moment of inertia of a solid sphere.
22. Use the reference circle model to describe the vibrational motion of an oscillating system.
23. Compute the heat exchanged during a process where a phase change occurs.
24. List and describe the three basic processes of heat transfer.
25. Apply the 1st law of thermodynamics to find the temperature change in an adiabatic process.
26. Apply the 2nd law of thermodynamics to find the efficiency of a Carnot engine.

#### **General Education Student Learning Outcomes:**

- 1. Critical Thinking:** The student analyzes, evaluates, and, if necessary, challenges the validity of ideas, principles, or data in order to develop informed opinions, probable predictions, or defensible conclusions.
- 2. Scientific and Mathematical Literacy:** The student properly identifies and applies scientific or mathematical principles and methods.
- 3. Information Literacy:** The student effectively locates, evaluates, and applies information from a variety of sources.

**Methods of Evaluation:** At minimum, the instructor will cover content which aligns with statewide and institutional learning outcomes for the course. The instructor will measure student performance using the following:

Grade calculation: Your final grade is based on your (1) Homework, (2) Quizzes, and (3) Exams

Percentage break-down:	Homework:	24%
	Attendance:	1%
	<u>Exams:</u>	<u>75%</u>
	Total:	100%

Grade Point Average:

A (90–100%)	B+ (87–90%)	B (80–87%)	C+ (77–80%)
C (70–77%)	D+ (67–70%)	D (60–67%)	F (< 60%)

#### **Instructor Requirements:**

##### **Reading List:**

Unit 1:

- Chapter 1 - Units and Measurement
- Chapter 2 - Vectors
- Chapter 3 - Motion Along a Straight Line
- Chapter 4 - 2D and 3D Linear Motion

- Chapter 5 - Newton's Laws of Motion (Forces)
- Chapter 6 - Applications of Newton's Laws of Motion
- Unit 2:
  - Chapter 7 - Work and Kinetic Energy
  - Chapter 8 - Potential Energy and Energy Conservation
  - Chapter 9 - Momentum and Collisions
  - Chapter 10 - Rotational Motion and Torque
  - Chapter 11 - Angular Momentum
- Unit 3:
  - Chapter 12 - Equilibrium and Elasticity
  - Chapter 13 - Gravitation
  - Chapter 14 - Fluid Mechanics
  - Chapter 15 - Oscillations
  - Chapter 16 - Waves
  - Chapter 17 - Sound
- Unit 4: (Vol 2 of Openstax textbook)
  - Chapter 1 - Temperature and Heat
  - Chapter 2 - Ideal Gases, Heat Capacity, and Phase Changes
  - Chapter 3 - The First Law of Thermodynamics
  - Chapter 4 - The Second Law of Thermodynamics

**Student Expectations:** Students enrolled in this course can expect the following:

1. Clearly identified course objectives;
2. Productive class meetings;
3. A positive learning environment;
4. Opportunities for appropriate student participation;
5. Effective instruction;
6. Positive and appropriate interactions;
7. Assistance with meeting course objectives during and beyond class hours;
8. Evaluation of student performance and appropriate and timely feedback; and
9. Clear and well-organized instruction.

**Academic Dishonesty Statement:** Pensacola State College is committed to upholding the highest standards of academic conduct. All forms of academic dishonesty, to include plagiarism and cheating, are prohibited. Penalties for academic dishonesty include but are not limited to one or more of the following: the awarding of no credit on the assignment, a reduction in the course grade, or the assignment of a final course grade of F and removal from the course. See the College Catalog for more details: [Academic Integrity](#)

**ADA Statement:** Students with a disability that falls under the Americans with Disability Act Amendments Act of 2008 or Section 504 of the Rehabilitation Act should contact the Student Resource Center for ADA Services to discuss academic accommodations. Appropriate academic accommodations are determined on an individual basis with careful consideration of the course learning outcomes and the documentation of the disability. For more information, students should visit the Student Resource Center for ADA Services on the Pensacola campus in building 6, room 603; call 850-484-1637; email [ADAservices@pensacolastate.edu](mailto:ADAservices@pensacolastate.edu); or complete the online intake form in the ADA Services app within the MyPSC apps dashboard.

**Emergency Statement:** In the case of severe weather or other emergency, the College administration maintains communication with appropriate state and local agencies and makes a determination regarding the cancellation of classes. Notices of cancellation will be made through the College's PSC Alert system and on the College's website.

**Flexibility Statement:** It is the intention of the instructor to accomplish the objectives specified in the course syllabus. However, circumstances may arise which prohibit the fulfilling of this endeavor. Therefore, this syllabus is subject to change. When possible, students will be notified of any change in advance of its occurrence.

**Non-Discrimination Statement:** Pensacola State College does not discriminate against any person on the basis of race, color, ethnicity, religion, sex (as defined by applicable federal and state law), national origin, age, disability, genetic information, pregnancy, or marital status in its educational programs, activities, or employment. For inquiries regarding the College's nondiscrimination policies, contact the Civil Rights Compliance Officer at (850) 484-1759, Pensacola State College, 1000 College Blvd., Pensacola, Florida 32504.

**Security Statement:** Pensacola State College is committed to encouraging all members of the College community to be proactive in personal safety measures. In case of emergency, students should ensure that they are aware of the building exit closest to each of their classrooms, as well as all alternative building exits in case circumstances require using a different route.

**Student Email Accounts:** Pensacola State College provides an institutional email account to all students enrolled in courses for credit. PirateMail is the official method of communication, and students must use PirateMail when communicating with the College. In cases where companion software is used for a particular class, email may be exchanged between instructor and student using the companion software.