

**JAMESTOWN COMMUNITY COLLEGE**  
**State University of New York**

---

**INSTITUTIONAL COURSE SYLLABUS**

**Course Title:** Analytical Physics I

**Course Abbreviation and Number:** PHY 1710

**Credit Hours:** 4

**Course Type:** Lecture/Lab

**Course Description:** Students will use computer-based laboratory techniques to learn about Newtonian mechanics. They will learn good problem-solving strategies as well as good laboratory practices. They will use vector analysis and calculus to study linear kinematics, dynamics, and conservation laws for momentum and energy. Students will investigate rotating systems and rigid bodies, including solving problems which use angular momentum, torque, center of mass, and moment of inertia concepts. They will also explore simple harmonic oscillators and wave motion. This is the first semester in a three-semester sequence of physics courses designed for students planning to major in physics, chemistry, mathematics, engineering science, or computer science. Students will begin to become aware of physics in everything they do and see. A tutorial session is available and strongly recommended.

Prerequisite: ENG 1510, MAT 1710, and high school physics or PHY 1500 or PHY 1610.

---

**General Education Requirements Met**

**SUNY**

Natural Sciences

**JCC**

Scientific Reasoning

---

**Student Learning Outcomes:**

Students who demonstrate understanding can:

1. Write laboratory reports using proper grammar in which they:
    - a. describe a purpose
    - b. propose a hypothesis
    - c. summarize and analyze observations
    - d. draw a conclusion
  2. Design and interpret graphs or tables of data.
  3. Explain, give examples of and illustrate applications of the concepts of physics in the following areas:
    - a. Force and motion (Newton's 3 Laws)
    - b. Impulse-momentum
    - c. Graphic kinematics
    - d. Momentum-conservation
    - e. Work and energy
    - f. Rotary motion
    - g. Energy conservation
    - h. Forces (gravity & Friction) & Superposition of forces
  4. Choose effective problem solving techniques on multiple layered problems using algebra, trigonometry, as well as differential and integral calculus.
    - a. metric conversion
    - b. force and motion (projectile)
    - c. kinematics
    - d. work and energy
    - e. force and motion (linear and projectile)
    - f. equilibrium (translational & rotational)
    - g. force and motion (rotary)
    - h. conservation of energy and momentum
    - i. moments of inertia
    - j. torques and forces on solid
  5. Use a computer and associated probes and sensors and software to collect and analyze data.
  6. Collaborate in the laboratory and/or classroom
  7. Demonstrate competency with standard physics equipment, such as computer interfaced probes, triple beam balances, vernier calipers and micrometers, optional balances, and rotational inertia apparatus.
- 

**Topics Covered:**

- Concepts of Motion
- Kinematics in One Dimension
- Vectors and Coordinate Systems
- Kinematics in two dimensions
- Force and Motion
- Dynamics 1: Motion in a straight line
- Newton's Third Law
- Dynamics 2: Motion in a Plane (to include rotational dynamics)

- Impulse and Momentum
  - Energy
  - Work
  - Rotation of a Rigid Body
  - Newton's Law of Gravity (if time permits)
  - Fluids and Elasticity (if time permits)
- 

### Information for Students

- Expectations of Students
    - [Civility Statement](#)
    - [Student Responsibility Statement](#)
    - [Academic Integrity Statement](#)
  - [Accessibility Services](#)

Students who require accommodations to complete the requirements and expectations of this course because of a disability must make their accommodation requests to the Accessibility Services Coordinator.
  - [Get Help: JCC & Community Resources](#)
  - [Emergency Closing Procedures](#)
  - Course grade is determined by the instructor based on a combination of factors, including but not limited to, homework, quizzes, exams, projects, and participation. Final course grade can be translated into a grade point value according to the following:

A=4.0	B+=3.5	B=3	C+=2.5	C=2	D+=1.5	D=1	F=0
-------	--------	-----	--------	-----	--------	-----	-----
  - Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, VA appointments) are welcome and encouraged to communicate these to the instructor.
- 

**Effective Date:** Fall 2023