



DEPARTMENT OF SCIENCE
COURSE INFORMATION SHEET FOR
PHY111 – GENERAL PHYSICS I

All members of the Science Department at Clinton Community College use the respective course templates as a basis for their course syllabi. Faculty may, at their discretion, change the order of the course content or add course content.

COURSE NUMBER AND TITLE: PHY111 – General Physics I

COURSE SECTION: *TBA*

CONTACT HOURS: 5 **CREDIT HOURS:** 4

SEMESTER AND YEAR: *TBA*

INSTRUCTOR'S NAME, TELEPHONE NUMBER, EMAIL ADDRESS, OFFICE NUMBER, AND OFFICE HOURS: *TBA*

I. COURSE DESCRIPTION:

This is the first of a two-semester sequence which covers: mechanics, which includes the study of linear, circular and rotational motion and how Newton's laws, and the concepts of energy and momentum can be applied, thermodynamics including temperature, heat transfer, and changes in state, and analysis of the sinusoidal nature of simple harmonic motion. There are three hours of lecture and one two-hour laboratory per week.

This course meets the SUNY General Education course requirements for natural sciences.

II. PREREQUISITE: MAT105 (For students planning on taking PHY 111 only)

OR

COREQUISITE: MAT200 - Precalculus or equivalent (For students planning on taking both PHY 111 and PHY 112)

III. COURSE OBJECTIVES, SUNY GENERAL EDUCATION KNOWLEDGE AREA LEARNING OUTCOMES AND ASSESSMENT:

COURSE OBJECTIVES:

As the result of instructional activities, students will be able to:

1. Be able to describe and apply the concepts of displacement, average velocity and instantaneous velocity to the solution of problems
2. Be able to describe uniformly accelerated motion and apply the equations of motion to the solution of problems.
3. Be able to analyze the motion of free falling objects
4. Be able to resolve a vector into its components

5. Be able to add and subtract any number of vectors both graphically and mathematically
6. Be able to describe the behavior of a projectile
7. Be able apply the concepts of two dimensional motion to the solution of problems.
8. Be able to state Newtons three laws
9. Be able to apply Newtons laws to the solution of problems
10. Be able to construct and analyze free body diagrams.
11. To be able to calculate centripetal acceleration and centripetal force, and apply these concepts to the solution of problems.
12. To be able to state Newton's Law of gravitation.
13. To apply centripetal motion and gravitation to explain and solve problems involving the motion of satellites around planets.
14. Be able to define work and energy and apply these concepts to the solution of problems
15. Be able to apply the conservation of mechanical energy to the solution of problems.
16. To define power, and explain the difference between power and energy
17. To explain impulse and momentum and apply these concepts to the solution of problems
18. To describe, explain and apply the concepts of the conservation of momentum
19. Be able to analyze the motion of rotational object by applying the equations of rotational kinematics
20. Be able to analyze the behavior of objects undergoing rotational motion by applying rotational dynamics, and concepts of rotational energy and angular momentum
21. Be able to apply the first and second conditions of equilibrium to objects that are at rest.
22. Be able to calculate expansions of solids and liquids when they undergo a change in temperature.
23. Be able to describe the state of gases as it undergoes changes in temperature, pressure and volume
24. Be able to describe specific heat, heat of fusion and heat of vaporization, and apply those concepts to the solution of problems
25. Be able to describe the energy transformations for an object vibrating with simple harmonic motion.
26. Be able to use the relationship between circular motion and simple harmonic motion to explain how velocity and period can be determined.
27. Apply concepts of simple harmonic motion to be able to calculate period and frequency for a mass vibrating on a spring and for a simple pendulum.
28. Be able to record, organize, graph and perform computations upon the data collected in the laboratory.
29. Be able to prepare a written laboratory report that effectively interprets and communicates their results.
30. Be able to effectively use computers as a tool for communication, data collection, data analysis.

SUNY GENERAL EDUCATION KNOWLEDGE AREA LEARNING OUTCOMES:

Students will demonstrate the ability to:

1. understand the methods scientists use to explore natural phenomena, including:
 - observation
 - hypothesis development

- measurement and data collection
 - experimentation
 - evaluation of evidence
 - employment of mathematical analysis
2. apply scientific data, concepts and models in one of the natural sciences

IV. REQUIRED TEXTBOOK AND MATERIALS:

REQUIRED TEXTBOOK:

1. Physics, 6th Edition; Giancoli. Prentice Hall.
ISBN# : 0-13-060620-0
2. Physlet Physics; Christian and Belloni .Prentice Hall.
ISBN# : 0-13-101969-4
3. Physics 111 Laboratory Manual

REQUIRED MATERIALS:

Safety glasses are required for all on-campus sections.

V. METHODS OF INSTRUCTION/COURSE ORGANIZATION: *To be determined by the respective instructor.*

VI. ATTENDANCE PROCEDURE (INCLUDING MAKEUP POLICY): *To be determined by the respective instructor.*

VII. BIBLIOGRAPHY OF READINGS (IF APPLICABLE): *To be determined by the respective instructor.*

VIII. METHODS OF EVALUATION (INCLUDING THE CALCULATION OF COURSE GRADE): *To be determined by the respective instructor. The methods of evaluation shall include tests (test types, length and weight of each), papers (weight of each), projects (weight of each), and other forms of evaluation (weight of each).*

IX. GRADING SCALE: *To be determined by the respective instructor. The grading scale shall indicate what numerical scores correspond to the following grades: A, A-, B+, B, B-, C+, C, C-, D+, D, and F.*

Please Include: If you have, or suspect you may have, any type of disability or learning problem that may require extra assistance or special accommodations, please speak to me privately after class or during my office hours as soon as possible so I can help you obtain any assistance you may need to successfully complete this course. You should also contact Laurie Bethka, Room 420M in the Academic Assistance Center, for further assistance.

X. GENERAL TOPICS OUTLINE:

1. Introduction
 - a) What is physics and how it relates to other fields
 - b) Models and theories

- c) Orders of magnitude
- 2. Kinematics in one dimension
 - a) Speed, velocity and displacement
 - b) Frames of reference
 - c) Acceleration
 - d) Free falling motion
- 3. Kinematics in two dimensions
 - a) Adding vectors using graphical techniques
 - b) Using analytical methods for adding vectors
 - c) projectile motion
- 4. Dynamics
 - a) Force
 - b) Newton's Laws of motion
 - c) Weight
 - d) Friction and Inclines
- 5. Circular Motion
 - a) Kinematics of circular motion
 - b) Dynamics of circular motion
 - c) Gravitation
 - d) Satellites and weightlessness
 - e) Fundamental forces
- 6. Work and Energy
 - a) Work
 - b) Kinetic energy
 - c) Potential energy
 - d) Conservation of energy
 - e) Power
- 7. Linear Momentum
 - a) Momentum and Force
 - b) Conservation of Momentum
 - c) Collision and impulse
 - d) Center of mass
- 8. Rotational Motion
 - a) Angular quantities
 - b) Kinematics for uniformly accelerated rotational motion
 - c) Torque
 - d) Rotational Dynamics
 - e) Rotational Kinetic Energy
 - f) Angular momentum
- 9. Bodies in Equilibrium
 - a) Statics and equilibrium
 - b) Statics problems
- 10. Temperature and kinetic energy
 - a) Temperature
 - b) Expansion
 - c) The gas laws and Absolute temperature
 - d) Kinetic theory
- 11. Heat
 - a) Heat and Energy
 - b) Specific Heat and Calorimetry
 - c) Latent Heat
 - d) Heat Transfer
- 12. Vibrations and waves
 - a) Simple Harmonic Motion

- b) The pendulum
- c) Resonance

XI. ACADEMIC INTEGRITY: Academic honesty is expected of all Clinton Community College students. It is academically dishonest, for example, to misrepresent another person's work as one's own, to take credit for someone else's work or ideas, to accept help on a test, to obtain advanced information on confidential test materials, or to intentionally harm another student's chances for academic success.

XII. COURSE CONTINUITY PLAN: In the case that the college officially closes because of an emergency which causes a short term disruption of this course, we will utilize e-mail to continue this course in the short term (1-3 weeks). All students need to utilize their campus e-mail to receive course related information.