



DEPARTMENT OF SCIENCE
COURSE INFORMATION SHEET FOR
PHY112 – GENERAL PHYSICS II

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: PHY112 – General Physics II

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 a continuation of General Physics I with the following topics included: waves and sound, electricity and magnetism, optics, quantum and nuclear physics. There are three hours of lecture and one two-hour laboratory per week.

II. PREREQUISITE: PHY111 – General Physics I and MAT 200-Precalculus

III. COURSE OBJECTIVES:

As the result of instructional activities, students will:

1. be able to list and explain the general properties of waves
2. be able to describe and explain standing wave patterns and be able to solve problems related to them.
3. be able to describe the general properties of sound
4. be able to solve problems related to intensity levels of sound and frequencies of vibrating strings and air columns
5. be able to describe and solve problems related to the Doppler effect.
6. be able to describe what static electricity is and how it originates
7. be able to describe Coulomb's Law and apply it to the solution of problems
8. be able to calculate electrical field intensities for one or more charges
9. be able to define and calculate electrical potential for one or more charges

10. be able to describe how capacitors function and apply the basic equations to the solution of problems
11. be able to describe and define voltage, current and resistance
12. be able to explain and apply Ohm's law, Kirchoff's rules and the power formula to the solution of problems
13. be able to analyze series, circuits, parallel circuits and series-parallel circuits.
14. be able to describe the behavior of capacitors in electric circuits, and apply the formulas for charging and discharging of capacitors to the solution of problems.
15. be able to describe and apply the right hand rules to predict direction of magnetic fields and direction of forces on current carrying conductors
16. be able to apply the formulas for computing magnitudes of magnetic fields, forces on conductors and charges in magnetic fields and induced voltages to the solution of problems
17. be able to describe how a transformer works and apply formulas for computing voltages and currents
18. list the properties of electromagnetic waves and compute frequencies and wavelengths of electromagnetic waves.
19. be able to explain how light reflects in plane and curved mirrors and apply the mirror equations to the solution of problems.
20. be able to explain how light refracts using Snell's law, and apply the lens equations to the solution of problems.
21. be able to describe and explain diffraction and apply the equations for single and double slits to the solution of problems.
22. be able to describe and explain thin film interference and polarization.
23. be able to describe the photoelectric effect, and explain how the photon theory explains the results obtained.
24. be able to describe the Bohr model of the atom and be able to compute the frequency and wavelengths emitted or absorbed as electrons change energy levels.
25. be able to describe the makeup of the nucleus and be able to calculate binding energies for nuclei.
26. be able to describe the three types of nuclear disintegration reactions, and be able to apply the equations of rate of disintegration to the solution of problems.
27. be able acquire skills so that they may be able to competently use equipment normally found in a physics laboratory, and be able to record, present, and perform computations upon the data collected by this equipment.

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 112 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. Waves
 - a. Wave Motion
 - b. Types of Waves
 - c. Behavior of waves
 - d. Standing Waves
2. Sound
 - a. Characteristics of sound
 - b. Intensity of sound
 - c. Vibrating strings and air columns
 - d. Interference of sound waves
 - e. The Doppler effect
3. Electrical Charge and Electrical Fields
 - a. Static electricity
 - b. Charges in the atom
 - c. The electroscope
 - d. Coulomb's law
 - e. The electric field

4. Electrical Potential and Electrical energy
 - a. Electrical potential and potential difference
 - b. The electron volt
 - c. Electrical potential due to a point charge
 - d. Capacitors
5. Electric Currents
 - a. The electric battery
 - b. Electric current
 - c. Ohm's law and resistance
 - d. Electric power
 - e. Alternating current
6. DC Circuits and Instruments
 - a. Resistors in series and parallel
 - b. EMF and terminal voltage
 - c. Kirchoff's Rules
 - d. Capacitors in series and parallel
 - e. DC ammeters and voltmeters
7. Magnetism
 - a. Magnets and magnetic fields
 - b. Magnetic field produced by electrical currents
 - c. Domain theory
 - d. Force on an electric current in a magnetic field
 - e. Force on a moving charge in a magnetic field
 - f. Applications
8. Electromagnetic Induction and Faraday's laws
 - a. Induced EMF
 - b. Faraday's laws
 - c. Electric Generators
 - d. Transformers
9. Electromagnetic waves
 - a. Maxwell's equations
 - b. Production of electromagnetic waves
 - c. The electromagnetic spectrum
10. Geometric Optics
 - a. The ray model of light
 - b. Index of refraction
 - c. Reflection and image formation
 - d. Refraction and Snell's law
 - e. Thin lenses
11. The Wave Nature of Light
 - a. Huygen's principle
 - b. Interference and Young's experiment
 - c. Dispersion
 - d. Diffraction and diffraction gratings
 - e. Thin film interference
 - f. Polarization
12. Quantum Theory and Models of the Atom
 - a. Planck's quantum hypothesis
 - b. Photon theory of light
 - c. Wave-Particle duality
 - d. Wave nature of matter
 - e. Early models of the atom

- f. The Bohr model
- 13. Nuclear Physics and Radioactivity
 - a. Structure and properties of the nucleus
 - b. Binding energy and nuclear force
 - c. Radioactivity
 - d. Alpha, Beta and Gamma decay
 - e. Conservation laws
 - f. Half life and radioactive decay
 - g. Decay series

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.