PHYS-1220: COLLEGE PHYSICS II

Cuyahoga Community College

Viewing: PHYS-1220 : College Physics II

Board of Trustees:
2018-05-24

Academic Term:
2018-08-27

Subject Code
PHYS - Physics

Course Number:
1220

Title:
College Physics II

Catalog Description:
Introductory algebra-based physics course designed for non-physics majors covering areas of physics which include electricity, magnetism, waves, sound, light, special relativity, atomic and nuclear physics.

Credit Hour(s):
4

Lecture Hour(s):
3

Lab Hour(s):
3

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
PHYS-1210 College Physics I.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.

For specific information pertaining to ADA accommodation, please contact your campus SAS office or visit online at http://www.tri-c.edu/accessprograms. Blackboard accessibility information is available at http://access.blackboard.com.

Eastern (216) 987-2052 - Voice
III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is, in part, based on your enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of the financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course, before financial aid funds can be applied to students’ accounts. Therefore, attendance will be recorded in the following ways:

For in-person courses, students are required to attend the course by the 15th day of the semester, or equivalent for terms shorter than 5-weeks, to be considered attending. Students who have not met all attendance requirements for an in-person course, as described herein, within the first two weeks of the semester, or equivalent, will be considered not attending and will be reported for non-attendance and dropped from the course.

For blended-learning courses, students are required to attend the course by the 15th day of the semester, or equivalent for terms shorter than 5-weeks, or submit an assignment, to be considered attending. Students who have not met all attendance requirements for a blended-learning course, as described herein, within the first two weeks of the semester, or equivalent, will be considered not attending and will be reported for non-attendance and dropped from the course.

For online courses, students are required to login in at least two (2) times per week and submit one (1) assignment per week for the first two (2) weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for an online course, as described herein, within the first two weeks of the semester, or equivalent, will be considered not attending and will be reported for non-attendance and dropped from the course.

At the conclusion of the first two weeks of a semester, or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class, wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with class work because of a prolonged absence should confer with the instructor or a counselor.

IV. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available athttp://www.tri-c.edu/student-resources/documents/studenthandbook.pdf You must also comply with the College's Zero Tolerance for Violence on College Property available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

Outcomes

Course Outcome(s):

- Apply fundamental principles of electromagnetism, wave motion, sound, light, optics, wave-particle duality, atoms, relativity, and the nucleus to applications in engineering technology, health careers, and daily life.

Objective(s):

1. Apply Coulomb’s law describing the electrostatic interaction between point charges and solve qualitative problems involving Gauss’s law.
2. For discrete charge distributions, calculate the net electric field, net potential and the electric potential energy; solve problems involving relationships among electric fields, potential and potential energy.
3. Analyze circuits involving resistance and capacitance, including equivalent resistant, equivalent capacitance, circuits with DC sources, and the transient behavior of RC circuits.
4. Find the force on charged particles and current-carrying wires due to magnetic fields, and find the magnetic field due to current.
5. Apply Faraday's law and Lenz's law to problems involving electromagnetic induction.
6. Analyze circuits involving resistors, capacitors and inductors for their transient behavior and the behavior when connected across AC sources.
7. Describe the influence of electromagnetism, wave motion, sound, light, optics, wave-particle duality, atoms, relativity, and the nucleus on the environment.

Course Outcome(s):
Apply critical thinking skills to solve practical and theoretical problems utilizing fundamental principles of electromagnetism, wave motion, sound, light, optics, wave-particle duality, atoms, relativity, and the nucleus.

Objective(s):
1. Apply principles of modern physics to solve problems involving quantization of energy and momentum on topics as black body radiation, the photoelectric effect and Compton effect.
2. Solve problems involving relationships among electric fields, electric potential, and electric potential energy.
3. Explain and follow laboratory safety procedures.
4. Solve problems involving electromagnetic radiation, including problems on such concepts as energy density, intensity, polarization, radiation pressure and momentum.
5. Use the principles of geometric optics to solve problems involving reflection and refraction of light in applications such as plane mirrors, spherical mirrors and thin lenses.

Course Outcome(s):
Perform, support, analyze, and express results of laboratory experiments in written form

Essential Learning Outcome Mapping:
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):
1. Demonstrate techniques to setup and perform experiments and collect data.
2. Determine and report on likely sources of experimental error.

Methods of Evaluation:
1. Quizzes
2. Hour examinations
3. Final examinations
4. Formal laboratory reports
5. Informal laboratory reports
6. Problem assignments
7. Group work
8. Student presentations
9. Other or some combination of the above.

Course Content Outline:
1. Waves
   a. The nature and mathematical description of waves
   b. Sound waves and intensity
   c. Doppler effect
   d. Applications of sound in medicine
   e. The principle of linear superposition
   f. Interference and diffraction
2. Electric forces, fields, and energy
   a. Charges and source of electric fields and forces
   b. Conductors and insulators
   c. Coulombs law
   d. Gauss’s law
   e. Electric fields and field lines
f. Copiers and computer printers
g. Electric energy and potential
h. Capacitors and dielectrics
i. Biomedical applications of electric potential differences

3. Electric circuits
a. Electromotive force and current
b. Resistors and Ohm’s law
c. Serial and parallel circuits
d. RC circuits
e. Measurement of current and voltage
f. Safety and physiological effects of current

4. Magnetic forces and fields
a. Source of magnetic fields and forces
b. Force of magnetic field on a moving charge
c. The motion of a charge particle in a magnetic field
d. Ampere’s law
e. Magnetic materials

5. Electromagnetic induction
a. Induced electromotive force and current
b. Faraday’s law of electromagnetic induction
c. Lenz’s law
d. Application of electromagnetic induction to the reproduction of sound
e. The electric generator
f. Transformers

6. Alternating currents
a. Resistors, capacitors, and inductors in AC circuits
b. Resonance in electric circuits
c. Semiconductor devices

7. Electromagnetic waves
a. Nature of electromagnetic waves
b. Energy carried by electromagnetic waves
c. The Doppler effect and electromagnetic waves
d. Polarization

8. Reflection and refraction of light and Interferences of waves
a. Wave fronts and rays
b. Reflection of light with mirrors
c. Refraction of light with lenses
d. Compound microscopes
e. Telescopes
f. Interferences and Young’s double-slit experiment
g. X-ray diffraction

9. Special relativity
a. Events and inertial reference frames
b. The postulates of special relativity
c. Relativity of time and length
d. The equivalence of mass and energy
e. Relativistic addition of velocities

10. Particles and waves
a. Black body radiation and birth of quantum mechanics
b. The wave particle duality
c. The photoelectric effect
d. The Heisenberg uncertainty principle

11. Atomic and nuclear physics
a. Rutherford scattering and the nuclear storm
b. Bohr’s Model of the hydrogen atom
c. Quantum mechanical picture of the hydrogen atom
d. Pauli exclusion principle and the periodic table
e. X-rays and lasers
f. Medical application of the laser
g. Holography
h. The strong nuclear force and the stability of the nucleus
i. Radioactivity

12. Laboratory work
   a. Safety in the laboratory
   b. Physical measurement
   c. Experimental error
   d. Laboratory reports

Resources


Resources Other
2. "Phet Simulations". Phet.Colorado.edu
3. Audio-visual materials: videos, dvds, audio recordings, computer programs and simulations
4. Laboratory experiments developed by current and past instructors
5. Online homework and study programs

Instructional Services

OAN Number:
TMNS, OSC015, and OSC021 (2 of 2 courses, both must be taken)

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