Tompkins Cortland Community College

Master Course Syllabus

Course Discipline and Number: PHSC105 **Year: 2024-2025**

Course Title: General Physics II **Credit Hours: 4**

I. Course Description: This is the second half of a two-course sequence. Topics include electricity, magnetism, electromagnetic induction, optics, relativity, quantum physics, atomic, nuclear and elementary particle theories. In the laboratory sessions, error analysis and graphical analysis are emphasized. The course is intended for those with an interest in physics and without a background in calculus. A scientific calculator is required. PHSC105 fulfills the SUNY General Education Natural Science (and Scientific Reasoning) requirement. Prerequisites: PHSC104; prior completion or concurrent enrollment in ENGL100. 4 Cr. (3 Lec., 2 Lab.) Spring semester.

II. Additional Course Information:

1. This course is appropriate for several audiences: the Liberal Arts Math/Science major, for whom the course is one half of a restricted course pair; the student in any major who needs a science course as a general education requirement; and the student needing a foundation of knowledge in physics in order to pursue a related field such as computer science or health..
2. A scientific calculator is recommended.

III. Student Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Describe the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling.
2. Apply scientific data, concepts, and models to observed phenomena.

IV. Tompkins Cortland Institutional Learning Outcomes; Program Learning Outcomes; SUNY General Education Competencies and Knowledge and Skills Areas

Tompkins Cortland ILOs

Complete this section for “service” courses only (e.g., courses that are required of all students; courses that are not program specific but satisfy liberal arts requirements; or commonly used in multiple academic programs to meet non-program-specific requirements). Check only Institutional Learning Outcomes (ILOs) that are meaningfully developed and assessed in this course. For each ILO chosen, include the SLO to which it aligns.

Students will:
☐ Communicate effectively, in oral and written forms, taking into consideration audience and purpose.

☒ Apply principles and methods of scientific inquiry and quantitative reasoning appropriate to their discipline.

SLO#2. Apply scientific data, concepts, and models to observed phenomena.

☒ Use information, critical thinking, and the creative process to solve problems and reach conclusions.

SLO#1. Describe the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling.

☐ Use technology appropriate to their discipline.

☒ Describe the ways in which social, economic, or environmental sustainability depends on their own and the collective contributions of a diversity of ideas and people.

SLO#1. Describe the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling.

Program Learning Outcomes

Complete this section for program-specific courses (e.g., those that share the same discipline code as the academic program or satisfy requirements in related programs). List the academic program(s) here and note which Student Learning Outcomes align to specific Programmatic Learning Outcomes. Please see the MCS Instructions for more details.

Specify the Academic Program: **Liberal Arts Math/Science A.S.**

PLO #1 Communicate about mathematical and/or scientific models and processes to enable a broad audience to comprehend the concepts.
SLO#1 Describe the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling

PLO #2 Employ standard laboratory skills and apply hypothesis testing in a lab or field setting.
SLO#2. Apply scientific data, concepts, and models to observed phenomena

PLO #3 Analyze and evaluate mathematical or scientific data, utilizing them effectively to solve problems and draw conclusions
SLO#2. Apply scientific data, concepts, and models to observed phenomena

PLO #4 Use appropriate technology to perform calculations, experiments, solve problems and create presentations.

PLO #5 Describe/explain how their contributions in the math/science fields may have far reaching social, economic, or environmental sustainability implications.

SUNY General Education Competencies

If this course assesses a SUNY GEN ED Competency, check all that apply and indicate which course outcome(s) address each checked item:

☐ CRITICAL THINKING & REASONING- Students will:

a. clearly articulate an issue or problem;
b. identify, analyze, and evaluate ideas, data, and arguments as they occur in their own or others' work; acknowledge limitations such as perspective and bias; and
c. develop well-reasoned (logical) arguments to form judgments and/or draw conclusions.

☐ INFORMATION LITERACY - Students will:

a. locate information effectively using tools appropriate to their need and discipline; evaluate information with an awareness of authority, validity, and bias; and demonstrate an understanding of the ethical dimensions of information use, creation, and dissemination.

Course SLO(s):

☒ SUNY GENERAL EDUCATION KNOWLEDGE AND SKILLS AREA(s): **Natural Sciences (and Scientific Reasoning)**

For courses that are approved to meet one (or more) of the ten SUNY General Education Knowledge and Skills Areas, indicate which area the course fulfills, and which outcome(s) are aligned with the SUNY outcomes for that area:

Students will demonstrate scientific reasoning applied to the natural world, including

- an understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling; and

SLO#1 Describe the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling

- application of scientific data, concepts, and models in one of the natural sciences.

SLO#2. Apply scientific data, concepts, and models to observed phenomena.

☐ This course does not address any of the above Tompkins Cortland ILOs, PLOs, or SUNY General Education Competencies or Knowledge and Skills Areas.

V. Essential Topics/Themes

1. The scientific measurement system.
2. Laws of physics regarding electricity, magnetism and electromagnetic radiation
3. Geometric optics and wave optics
4. Relativity, quantum physics, atomic structure, nuclear structure, and elementary particles
5. Given a reasonable amount of guidance, students will assemble lab equipment, perform experiments, correctly use measuring tools to obtain data, interpret the results using graphical or error analysis. Each experiment will be a test of one of the theories presented in the lecture part of the class

VI. Methods of Assessment/Evaluation

Method	**% Course Grade**
1. Lab Final Exam	0-20%
2. Frequent Quizzes	10-50%
3. Lab Reports and Assignments	15-30%
4. Unit Exams	0-50%

5. Final Exam	15-30%

VII. Texts – ☒ Required ☐ Recommended ☐ Used for more than one course (list courses)

High school instructors may consult with staff in the CollegeNow office for additional information and guidance.

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1. College Physics (2018), Raymond A. Serway and Chris Vuille, Volume 2, 11th edition, Cengage Learning	☐

Editions listed are current as of date of syllabus. More recent editions may be used.

VIII. Bibliography of Supplemental Materials

1. Conceptual Physics, 7th ed., by Paul Hewitt (Harper Collins College Publishers, © 1993)
2. The Cartoon Guide to Physics, by Larry Gonick and Art Huffman (Harper Perennial, © 1990).
3. Encyclopedia of Physics, 3rd ed., edited by Lerner and Trigg, (Wiley, © 2005)

Editions listed are current as of date of syllabus. More recent editions may be used.

IX. Other Learning Resources

Audiovisual: The Mechanical Universe; Annenberg 1984
Electronic: Computer software, such as Interactive Physics, Latest Edition, © 2006
Other: Graphing calculators

Attendance Policy: *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

Services for Students with Disabilities: *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for academic adjustments. All course materials are available in alternate formats upon request.*

Academic Integrity: *Every student at Tompkins Cortland Community College is expected to act in an academically honest fashion in all aspects of their academic work: in writing papers and reports, in taking examinations, in performing laboratory experiments and reporting the results, in clinical and cooperative learning experiences, and in attending to paperwork such as registration forms.*
Any written work submitted by a student must be their own. If the student uses the words or ideas of someone else, they must cite the source by such means as a footnote. Our guiding principle is that any honest evaluation of a student's performance must be based on that student's work. Any action taken by a student that would result in misrepresentation of someone else's work or actions as the student's own — such as cheating on a test, submitting

for credit a paper written by another person, or forging an advisor's signature — is intellectually dishonest and deserving of censure.

Several degree programs offer student learning opportunities (such as internships, field work, and clinical experiences) outside the standard classroom setting. As part of the learning process, students must understand and engage in conduct that adheres to principles guiding employment within the professional workplace. These behaviors include, but are not limited to, academic integrity, accountability, reliability, respect, use of appropriate language and dress, civility, professional ethics, honesty, and trustworthiness. Disciplinary action may be initiated for inappropriate conduct occurring while participating in any course-related project or event.