



NEW JERSEY CENTER
FOR TEACHING & LEARNING

PHYS-6631: Learning and Teaching PSI AP Physics C - Mechanics

Instructor: Dr. John Ennis

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Course Credit: 4.0 NJCTL credits

Dates & Times:

This is a 4-credit, self-paced course, covering 10 modules of content. The exact number of hours that you can expect to spend on each module will vary based upon the module coursework, as well as your study style and preferences. You should plan to spend 18-20 hours per module, completing the module slides, readings, Short Answer Assignments, labs, Mastery Exercises, practice problems, and module exams.

COURSE DESCRIPTION:

This course is designed for those who are learning to teach calculus-based AP Physics C for high school or an equivalent course to college students, focusing on conveying physics and mathematical concepts and understandings. The critical topics of this course include vectors, one and two-dimensional kinematics, dynamics, energy, momentum, rotational motion, universal gravitation and simple harmonic motion. The underlying themes of this course include applying general principles of physics and advanced problem solving to all of these topics. The course asks students to identify, understand and communicate the elements, representations and models of scientific phenomena to solve scientific problems, using calculus as a mathematical base. Technology serves as a tool to establish these connections through exploration, problem solving, formative assessment, presentation, and communication.

STUDENT LEARNING OUTCOMES:

Upon completion of the course, the student will be able to:

1. Apply general principles of physics in the areas of vectors, one and two-dimensional kinematics, dynamics, energy, momentum, rotational motion, universal gravitation, and simple harmonic motion.
2. Apply student-centered pedagogy to teach physics to students.
3. Apply basic mathematical tools commonly used in physics including algebra, trigonometry, and graphical analysis.

4. Identify, understand, and communicate the elements, representations, and models of scientific phenomena to solve scientific problems.
5. Analyze concepts, graphs, data, and variable relationships to determine electric force, electric field, and electric potential in relation to their currents and circuits.
6. Examine, investigate, and assess the relationships between various physics models and their variable.

TEXTS, READINGS, INSTRUCTIONAL RESOURCES:

Required Texts:

- PSI AP Physics C: Mechanics uses a free digital text book accessible at: <https://njctl.org/courses/science/ap-physics-c-mechanics/>
- Participants will download SMART Notebook presentations, homework files, labs, and teacher resources from the PSI AP Physics C Course

Recommended Texts and Resources:

- Next Generation Science Standards for Physical Science: <https://www.nextgenscience.org/sites/default/files/HS%20PS%20topics%20combined%2006.12.13.pdf>
- AP Central: <https://apcentral.collegeboard.org/>

COURSE REQUIREMENTS:

Consistent attendance in your online courses is essential for your success. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your advisor.

Online classes have assignments and participation requirements just like on-campus classes. Budget your time carefully. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

In order to receive a Passing grade, the participant must complete the following course requirements: all short answer assignments, mastery exercises, labs, exams, and the reflection paper outlined in the *Assignments* section of the Class Schedule (below).

GRADE DISTRIBUTION AND SCALE:

Grade Distribution:

Module Exams	70%
Final Exam	10%
Short Answer Assignments	6%
Labs	6%
Mastery Exercises	6%
Reflection Paper	2%

Grade Scale:

A	93 – 100
A-	90 – 92
B+	86 – 89
B	83 – 86
B-	80 – 82
C+	77 – 79
C	73 – 76
C-	70 – 72
D	60.0 – 69.9
F	59.9 or below

ACADEMIC STANDING:

NJCTL has established standards for academic good standing within a student's academic program. Students enrolled in any NJCTL online course must receive an 80 or higher to successfully complete a course and receive credit for that course. An 80 is equivalent to a GPA of 2.7 or B-. Additionally, students in an endorsement program must receive a cumulative GPA of 3.0 for all courses combined in order to successfully complete the program.

ACADEMIC INTEGRITY:

Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /re-purposing your own work, unauthorized possession of academic materials, and unauthorized collaboration.

CITING SOURCES WITH APA STYLE:

All students are expected to follow proper writing and APA requirements when citing in APA (based on the APA Style Manual, 6th edition) for all assignments.

DISABILITY SERVICES STATEMENT:

We are committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Dean of Students, Dr. Jamie Korns, additional information to coordinate reasonable accommodations for students with documented disabilities (Jamie@njctl.org).

NETIQUETTE:

Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom.

If you have concerns about something that has been said, please let your instructor know.

CLASS SCHEDULE:

Module	Required Readings	Assignments
0 – Optional Calculus Review	<ul style="list-style-type: none"> • Module lessons (optional) 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
1 - Vectors	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
2 – Kinematics in 1D	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
3 – Kinematics in 2D	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
4 - Dynamics	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
5 – Work & Energy	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
6 - Momentum	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
7 – Rotational Motion	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam

8 – Universal Gravitation	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
9 – Simple Harmonic Motion	<ul style="list-style-type: none"> • Module lessons 	<ul style="list-style-type: none"> • Short Answer Assignment • Lab • Mastery Exercise • Module Exam
10 – Reflection & Final Exam	<ul style="list-style-type: none"> • <i>Review Course Topics as needed</i> 	<ul style="list-style-type: none"> • Reflection Paper • Final Exam