NEW JERSEY CENTER
FOR TEACHING & LEARNING

PHYS 6605: Learning & Teaching AP Physics 2

Course Credit: 6.0 NJCTL credits

Dates & Times:

This is a 6-credit, self-paced course, covering 16 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 6-12 hours per module, completing the module slides, readings, short answer assignments, labs, mastery exercises, practice problems, and module exams.

Graduate Student Handbook: http://njctl.org/graduate-handbook/

COURSE DESCRIPTION:

This course is designed for those who are learning to teach Algebra-Based Physics and Trigonometry-Based Physics for middle school or high school students, focusing on conveying physics and mathematical concepts. Underlying themes are physics connections to everyday life, applications of algebra and trigonometry in physics, problem solving, and hands on laboratory experience. The course presents physics as the foundation for studying chemistry, biology and advanced mathematics. Technology serves as a tool to establish these connections through exploration, problem solving, formative assessment, presentation, and communication.

This course covers two-dimensional electricity and magnetism topics including electric force and field, electric potential and capacitors, magnetism and electromagnetic induction, and electromagnetic waves and an introduction to modern physics.

STUDENT LEARNING OUTCOMES:

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

1. Apply the basic principles of physics in the areas of two-dimensional electric charge and force, electric potential and voltage, DC and RC circuits, magnetism, electromagnetic induction, electromagnetic waves and quantum physics.
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 Algebra-Based Physics uses a free digital text book accessible at: https://njctl.org/courses/science/algebra-based-physics/
- Participants will download SMART Notebook presentations, homework files, labs, and teacher resources from the PSI Algebra-Based Physics Course
- Giancoli (2005). *Physics: Principles with Applications / Edition 6* ISBN-13: 9780130352569

Recommended Texts:

Holton, G. J., Brush, S. G., & Holton, G. J. (2001). *Physics, the Human Adventure: From Copernicus to Einstein and Beyond*. New Brunswick, N.J: Rutgers University Press. ISBN-13: 9780813529080

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 the Dean of Students.

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.

GRADE DISTRIBUTION AND SCALE:

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:

Module Exams	70%
Final Exam	10%
Labs	6%
Short Answer Assignments	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
1 - Electric Force & Field	• *Physics: Principles with Applications / Edition 6* Chapter 16 (Topic: Electric Charge & Force)	• Short Answer • Lab • Mastery Exercises • Module Exam
2 – Electric Potential	• *Physics: Principles with Applications / Edition 6* Chapter 17 (Topic: Electric Potential)	• Short Answer • Lab • Mastery Exercises • Module Exam
3 – Electric Current	• Pages 209-215 in *Physics, the Human Adventure* • *Physics: Principles with Applications / Edition 6* Chapter 17 (Topic: Electric Potential)	• Short Answer • Lab • Mastery Exercises • Module Exam
4 - Magnetism	• *Physics: Principles with Applications / Edition 6* Chapter 20 (Topic: Magnetism)	• Short Answer • Lab • Mastery Exercises • Module Exam
5 – Electromagnetic Induction	• *Physics: Principles with Applications / Edition 6* Chapter 21 (Topic: Electromagnetic Induction and Faraday's Law; Gauss's Law)	• Short Answer • Lab • Mastery Exercises • Module Exam
6 – Electromagnetic Waves	• *Physics: Principles with Applications / Edition 6* Chapter 24 (Topic: The Wave Nature of Light) and Chapter 11 (Topic: Electromagnetic Radiation)	• Short Answer • Lab • Mastery Exercises • Module Exam
7 – Geometric Optics	• *Physics: Principles with Applications / Edition 6* Chapter 22 (Topic: Electromagnetic Radiation)	• Short Answer • Lab • Mastery Exercises • Module Exam

8 – Quantum Physics	• *Physics: Principles with Applications / Edition 6* Chapters 20 (Topic: Magnetism)	• Short Answer • Lab • Mastery Exercises • Module Exam
9 – Nuclear Physics	• *Physics: Principles with Applications / Edition 6* Chapter 21 (Topic: Electromagnetic Induction and Faraday's Law)	• Short Answer • Lab • Mastery Exercises • Module Exam
10 - Fluids	• *Physics: Principles with Applications / Edition 6* Chapter 21 (Topic: Electromagnetic Induction and Faraday's Law)	• Short Answer • Lab • Mastery Exercises • Module Exam
11 – Thermal Physics	• *Physics: Principles with Applications / Edition 6* Chapter 21 (Topic: Gauss's Law)	• Short Answer • Lab • Mastery Exercises • Module Exam
12 – Final Reflection	• http://apcentral.collegeboard.com/apc/members/exam/exam_information/225439.html	• Reflection Paper • Final Exam