NEW JERSEY CENTER
FOR TEACHING & LEARNING

Progressive Science Initiative® (PSI®)

PHYS 4215: Mathematical Physics

Dates & Times:
This course covers all of the content normally taught in a full-year course. While it will take approximately 120 hours to complete, it is asynchronous, which allows students flexibility in scheduling. The exact number of hours will vary based on each student's study style and preferences.

COURSE DESCRIPTION:
This course is aligned to the Next Generation Science Standards and is for students to develop a strong scientific understanding of the science behind phenomena seen in the living world. Topics include constant speed & motion, acceleration, force, momentum, work & energy, kinetic energy, gravitation.

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

1. Identify and communicate about the elements, representations and models of scientific phenomena to solve scientific problems.
2. Develop a deeper scientific understanding of the phenomena present in the physical world that relate to physics.
3. Demonstrate mastery of Mathematical Physics content on a comprehensive exam.

TEXTS, READINGS, INSTRUCTIONAL RESOURCES:
Required Texts:

- PSI Mathematical Physics uses a free digital text book accessible at: https://njctl.org/materials/courses/mathematical-physics/

COURSE REQUIREMENTS:
In order to receive a passing grade, the participant must complete the following course requirements:

1. Activities: A number of different learning activities will ensure participant engagement and learning in the course. These include:
   - Engage in video module lessons which demonstrate minimized direct instruction followed by frequent formative assessment
   - Completion of formative assessments aligned to learning objectives which include detailed analysis when answered incorrectly.

- Interaction with module discussion boards that allow conversation with peers and course instructors about the module's content, delivering that content to students. Discussion boards also serve as a place to ask and answer questions related to the module's content.

2. Mastery Exercises: For each module, these multiple-choice question quizzes assess the content knowledge gained in a module. Participants have the opportunity to retake; random questions are pulled from a larger question bank on each attempt ensuring varied questions.
3. Virtual Labs: In each module, a virtual lab write-up will be submitted. Virtual Labs are interactive lab simulations that promote a deeper understanding of the content knowledge being learned through real-world applications and analysis.
4. Module Exams: Within each module, there are chapter tests which are culminating exams consisting of multiple choice and free response questions aligned to the standards and objectives of the module.
5. Final Exam: At the end of the course, a comprehensive exam consisting of Multiple Choice and Free Response questions assesses the content knowledge learned throughout the course.

GRADE DISTRIBUTION AND SCALE:

Grade Distribution:

Module Exams	65%
Final Exam	15%
Labs	10%
Mastery Exercises	10%

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 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.

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. Rosemary Knab, additional information to coordinate reasonable accommodations for students with documented disabilities (rosemary@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 – Rockets	• Presentations within LMS Course	• Lab • Mastery Exercises • Module Exams
2- Roller Coasters	• Presentations within LMS Course	• Lab • Mastery Exercises • Module Exams
3 – Mobile Phones	• Presentations within LMS Course	• Lab • Mastery Exercises • Module Exams
4 – Final Exam	• Review topics as desired	• Final Exam