PEP 242 Modern Physics

Department of Physics and Engineering Physics
Stevens Institute of Technology
Semester: Summer 2021

Schedule:
Tues and Thurs 9:30-10:45, GS216

Instructor for PEP 242: Prof. Robert Pastore

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Office Hours: Thursdays 12 am,or byappointment.

Course Description

Basic special relativity will be explored, time dilation, length contraction, Lorentz transformation and relativistic dynamics. Wave properties of electromagnetic waves and particle waves, and wave particle dualism. The Schrodinger equation and its interpretation, wave functions, Heisenberg Uncertainty principle, quantum mechanical tunneling and applications; quantum mechanics of a particle in a box, the hydrogen atom, electronic spin; properties of many electron atoms, atomic spectra; principles of lasers and applications, electrons in solids and molecules, conductors and semiconductors; properties of atomic nuclei; radioactivity; fusion and fission

Required Materials

Textbook: **Modern Physics for Scientists and Engineers Fourth Edition, ISBN: 978-1-133-10372-1, ISBN-10: 1-133-10372-3**

Course Objectives

Understand the concepts of special relativity and relativistic dynamics and their applications
Describe the particle like properties of electromagnetic radiation, the photoelectric effect and thermal radiation
The wavelike properties of particles using deBroglies Hypothesis and the Uncertainty Principle

The Schrodinger equation and its applications
Models of the atom: Rutherford and Bohr and how this describes line spectra
The hydrogen atom properties and the quantum mechanical description of these properties
Many electron atoms and their properties
Molecular and solid state physics
Nuclear structure: radioactivity, reactions and applications

Cell Phone Policy During Exams

No cell phones are allowed to be out during the examination. To this end cell phones will be placed on the desk by the proctor (me) during the exam or they can be placed in your back pack which will be placed in the front of the exam room during the exam. If a student is found with their cell phone during the exam they will be reported to the honor board.

Grading Procedure

Grades are calculated from a weighted average of homework and exams. The various components of your grade have the following weights:

Final Exam……..……30%
Exams ……..……..…….....40%
Homework …….25%
Participation…….5%

Final letter grades will be calculated based on the following distribution:

Letter Grade:	% Grade:
A	90-100%
A-	85-89.9%
B+/B/B-	70-84.9%
C+/C/C-	50-69.9%
D+/D/D-	30-49.9%
F	<30%

Homework: Homework will be written and from the problems at the end of each chapter. Homework will be assigned at the end of each chapter.

Exams: There will be in class exams. These exams will cover two, sometimes 3 chapters depending on the length of the chapters. You will make your own equation sheets for the exams with the equations and constants you think are pertinent for the exam. You will put your name on the equation sheet and hand it in with your exam. The equation sheet will be one 8 and ½ by 11 sheet front and back. You will be able to get your equation sheets back for the final exam.

Final Exam: There will be an in class final exam. It will be cumulative unless stated otherwise. You will be allowed 2 equation sheets for this exam. You can use the equation sheets you made previously although you might have to add material if there is not an exam for the last two chapters to be covered.

Lecture notes: Lecture notes will be posted in Canvas within 24 hours ***after*** each chapter has been completed in lecture.