PEP 242 Modern Physics

Department of Physics and Engineering Physics
Stevens Institute of Technology
Semester: Spring 2023

Schedule:
Tues and Thurs 9:30-10:45
EAS 330

Instructor for PEP 242: Prof. Robert Pastore

Email: rpastore@stevens.edu
Office: Burchard 707
Phone: 732-763-2109
Office Hours: by appointment.

Course Description

Wave properties; wave motion, wave optics, ray optics, wave-particle dualism; the Schrödinger equation and its interpretation; wave functions; the Heisenberg uncertainty principle; quantum mechanical tunneling and application; 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; conductors and semiconductors; the n-p junction and the transistor; properties of atomic nuclei; radioactivity; fusion and fission.

Required Materials

Textbook: **Physics for Scientists and Engineers with Modern Physics, Serway and Jewett 10e, ISBN-10 1-337-55329-8, ISBN-13 9781337553292**

Homework will be online and done using WebAssign
Course name: PEP242 spring 2023, section a
Class Key: **stevens 9192 5357**

Course Objectives

Understand the concepts of simple harmonic motion, wave motion, traveling waves and standing waves.
Understand the concepts of wave optics, interference and diffraction, explore geometric and ray optics
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%
B+/B/B-	80-89.9%
C+/C/C-	70-79.9%
D+/D/D-	60-69.9%
F	<60%

Homework: Homework will be done using webassign. The information for the webassign is listed previously in the syllabus. The homework assignments will be set up and all of them will be due on the last day of classes of the semester. This gets around the need for giving extensions when you get busy.

You should still do the assignments as we go over the material in order to prepare yourselves for the exams.

Exams: The exams will be take home exams using the online homework system in the exam mode. The exam will open on Friday morning and be due Monday morning. There will a spot to upload your written work for partial credit if you would like to receive partial credit. If you are going to do this please outline the answer somehow by either boxing it or highlighting it. Also, please spread the work out on the paper, I understand your desire to save paper but when everything is crammed together it is hard to read. Spacing your work out benefits you as it makes it easier for me to read and puts me in a better frame of mind.

Final Exam: the final exam will be the same format as the exams except there will be a little more time to take the exam. The final exam will be due the day the school has scheduled the final exam for this class and it will be due at the end of the time period on that day. So if the exam is scheduled from 1 to 4 pm it is due at 4 pm. No extensions will be given.

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