PHYS 7C - PHYSICS FOR SCIENTISTS AND ENGINEERS (III) (4 UNITS)

COURSE OVERVIEW

SUMMARY

Physics 7C is a lower division physics course intended for STEM majors. The course surveys three main fields: classical optics, special relativity, and introductory quantum mechanics. There is a laboratory section to the course, worth a small portion of your grade in the overall course. This course is offered both the fall and the spring semesters.

PREREQUISITES

Physics 7A (phys7a.html)/B (phys7b.html), Math 1A (math1a.html), 1B (math1b.html), 53 (math53.html), and 54 (math54.html) (54 can be taken concurrently)

TOPICS COVERED

- Optics
  - Maxwell’s equations and electromagnetic waves
  - Ray optics
  - Reflection, refraction
  - Double-slit interference, diffraction, and resolution
  - Polarization
- Special relativity
  - Reference frames, Einstein postulates

    - Four vectors
    - Lorentz transformations
    - Time and length transformations
    - Paradoxes
    - Doppler effect
    - Momentum and energy
    - Mass-energy relations
    - Relativistic dynamics
- Quantum mechanics
    - Blackbody radiation
    - Photoelectric effect
    - Compton scattering
    - Atomic nucleus
    - Bohr atom
    - Matter waves
    - 1D Schrödinger equation
    - Square well
    - Expectation values
    - Operators
    - Wave reflection/transmission

WORKLOAD

COURSEWORK

- Lab (5%)
- Homework (15%)
- Midterm 1 (20%)
- Midterm 2 (20%)
- Final (40%)

TIME COMMITMENT

Three hours of lecture per week, 5 four-hour labs throughout the semester, discussion (1-2 hours per week), and homework (3-6 hours per week).

CHOOSING THE COURSE

WHEN TO TAKE

Once you have finished the prerequisites (typically sophomore year, but you can take it whenever you would like).

WHAT NEXT?

For those interested in the optics portion of the course: Physics 110A/110B; for those interested in the relativistic portion of the course: Physics 139; for those interested in the quantum mechanics portion: Physics 137A/B, Chem 120A/221A.

ADDITIONAL COMMENTS AND TIPS

This course is nearly identical in structure and grading policy to the remainder of the physics 7 series.

Written by: Brighton Skeel

Last edited: Spring 2019