

# PHYS 152

# Spring 2021



This is a tentative syllabus. The final syllabus will be on Canvas. Questions? Please email [jbrody@emory.edu](mailto:jbrody@emory.edu)

**Course Objective:** Conceptual and quantitative understanding of electricity, magnetism, optics, and electronics.

**Course Competencies:** After completing this course, you will be able to:

- Incorporate electric and magnetic forces in force diagrams and applications of Newton's laws
- Calculate electric field and electric potential due to continuous charge distributions
- Calculate magnetic torque and explain the operation of electric motors
- Calculate magnetic field due to currents
- Calculate induced emf due to changing magnetic flux and explain the operation of generators
- Determine the location and magnification of images formed by lenses and mirrors
- Determine the optical patterns produced by single slits, double slits, and diffraction gratings
- Determine the conditions for constructive and destructive interference of light incident on thin films
- Calculate currents and voltages in DC and AC circuits

**Course Schedule:**

- Short asynchronous lectures are posted on Canvas.
- Synchronous classes are Thursdays 9:40-10:55, and office hours are Tuesdays 9:40-10:55. This is reversed the first week of the semester.
- Additional office hours are by appointment. Please do not hesitate to make appointments!

**Advice:** Do not struggle. I want to answer your questions so that you know exactly how to solve problems. Physics should be fun, not frustrating. You're welcome to email me questions 10+ times a day and schedule Zoom appointments with me as often as you like.

**Textbook:** Serway and Jewett, *Physics for Scientists and Engineers*, 10<sup>th</sup> edition, Chapters 22-37. **The ebook is included with purchase of WebAssign access.** There's no need to purchase a hardcopy.

#### Homework:

- Assigned and submitted on WebAssign
- WebAssign Class Key: **emory 8432 4117**
- Collaboration with peers is encouraged, but mindlessly copying someone else's homework won't help you prepare for tests
- Upon request, you will be granted one-week extensions on up to two homework assignments. Email extension requests to me. You don't need to tell me why you want the extension.

#### Grades

- 10% homework
- 15% each of three tests
- 20% lab (and you must pass lab to pass the course)
- 25% final exam

Week	Unit	Chapter	Topic
Jan. 24-30	Electricity	22	Electric field
Jan. 31-Feb. 6	Electricity	23	Continuous charge distributions
Feb. 7-13	Electricity	24	Electric potential
Feb. 14-20	Electricity	26	Current; Test 1 (Thursday)
Feb. 21-27	Magnetism	28	Magnetic field
Feb. 28-Mar. 6	Magnetism	29	Ampere's law
Mar. 7-13	Magnetism	30	Faraday's law
Mar. 14-20	Magnetism	33	Electromagnetic waves
Mar. 21-27	Optics	34	Test 2 (Tuesday); ray optics
Mar. 23-Apr. 3	Optics	35	Mirrors and lenses
Apr. 4-10	Optics	36	Interference
Apr. 11-17	Optics	37	Polarization; Test 3 (Thursday)
Apr. 18-24	Electronics	25, 27	Resistors and capacitors
Apr. 25-May 1	Electronics	31, 32	Inductors and AC circuits