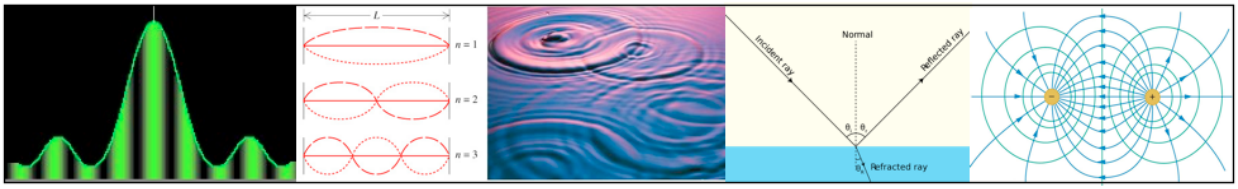
Physics 195: Waves and Fields
Syllabus · Spring 2016



Lecture: 10-10:50 am MWF, G041
Office Hours: MF 3-5pm and by appointment, G051 or 1038
Email: kjonessm@hamilton.edu
Text: Halliday, Resnick & Walker, *Fundamentals of Physics, Extended*, 10th edition.
Taylor, *An Introduction to Error Analysis*, 2nd edition.

Description: The concepts of waves and fields, and the related mathematical formalism, are of great importance in physics. In this course we will study these constructs in the context of three main areas. First, we study oscillations beginning with the single most important physical system, the simple harmonic oscillator. We broaden this analysis to include the presence of damping, driving and resonance, and derive the wave equation and properties of waves. We then turn to electromagnetism to study basic configurations of electric and magnetic fields, the Lorentz force, and electromagnetic radiation. Finally we study various properties of light, beginning with geometric optics in which light is treated as a ray, and then turning to the diffraction experiments which reveal the wave nature of light. This material corresponds to roughly Chapters 15-36 in HRW, though a few chapters will be omitted.

Homework and Reading Quizzes: Homework will be assigned weekly and posted to Blackboard. It will consist of both reading and exercises. As discussed on the first day of class, it is imperative that you do both the assigned reading and the exercises in order to do well in this course and get the most out of it. There will be unannounced quizzes whose questions will be taken directly from the reading, based on or identical to the Checkpoints or odd-numbered Conceptual Questions in HRW. I will drop your 2 or 3 lowest quiz scores at the end of the semester. Barring special circumstances, late homework is not accepted; your lowest homework score will be dropped.

Lab: Experiments are at the heart of every scientific discipline and lab is a mandatory part of this course. The purpose of the lab for this course is to familiarize you with relevant experimental techniques, most importantly the analysis of errors. Lab sections are Tuesday, Wednesday, and Thursday from 1-4 pm. You must attend all labs this semester. If you cannot make your ordinary lab section you must attend another section, as we generally do not have a make-up lab at the end of the term. If you cannot attend another section you must discuss your circumstances with your lab instructor and have a valid, documented excuse.

Grading Scheme: Your grade will be determined according to the following scheme:
Homework: 15%
Reading Quizzes: 15%
Lab: 20%
Exam 1: 15%
Exam 2: 15%
Final Exam: 20%

Etiquette & Policies: *Etiquette:* Physics can be a challenging subject for many. Please maintain a respectful attitude in lecture, lab, and office hours.
Laptops: Laptops, cell phones, tablets, etc. are not allowed in lecture. If you wish to take notes it should be on paper by hand. If this poses any difficulty for you whatsoever please let me know and we can find a solution that suits your needs.
Honor Code: All of your work in this course should be in keeping with Hamilton's Honor Code. You must include a signed honor code statement on all of your assignments in this course.

Accommodations: I request that anyone needing academic adjustments or accommodations speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities should also contact Allen Harrison, Associate Dean of Students for Multicultural Affairs and Accessibility Services in the Office of the Dean of Students (Elihu Root House; ext. 4021) who coordinates services for students with disabilities.