

The Idiom & Practice of Science

Winter '17

Physics H90

Music, Earthquakes, & Light: Waves in our World

Professor Roger McWilliams

Laboratory: B010 Reines Hall

which is on the external loading dock at Latitude 33.6443, Longitude -117.8433

Lab phone: 949-824-6228; mcw@uci.edu

Office Hours: Before and after class at lab and by appointment

Class: MWF 11:00-11:50 in Physical Sciences Classroom Building (PSCB) 140

Discussion (Optional): Tu 3:00 RH 108 and Th 4:00 HICF 100N

Textbook: *Measured Tones*, Third Edition, Ian Johnston

(And recommended, not required: *Earthquakes*, any edition, Bruce Bolt)

Course Grade: midterm (25%), final (35%), homework (30%), 2 performance analyses (5% each). Midterm and final formats: multiple choice, short answer, long answer problems. Exams will be open book, open notes, calculators allowed.

Tested material include "Physics Today" lecture topics of physics from news and daily life. The primary material of the course will be found in the lecture notes taken in class, the texts are supplemental to the lectures. Homework: Assigned at each lecture, due at next lecture. 2 live music performance analyses: For each, in at least two pages, write a scientific analysis of the music. Describe the technology used for the music production and transmission. What emotive end resulted and what science was central to achieving that end? It is recommended that one regularly dedicates no less than two hours of study and homework time per hour of course lecture. Neither procrastination nor massive cramming before exams works in learning physics. Physics is learned by experimenting and doing lots of homework problems.

Approximate Course Calendar (Month/day: Chapter, Assignment Due):

1/9: 1

1/11: 2

1/18: First analysis due

1/20: 3

1/25: 4

2/1: 5

2/3: Midterm

2/8: 6

2/15: 7

2/22: 8

3/1: 9

3/8: Second analysis due

3/17: Review

3/24: Final exam (8:00 – 10:00 a.m.)

Methods of Teaching, Learning, and Grading for this Course

Several points will aid in course learning, studying, and expectations.

1.) Science is observed truth, tied together by general law, with predictive capability. This quarter emphasizes all three elements. Notice science is not about a give-me-a-formula to plug-into-for-answer perspective.

a.) Observed Truth: You will learn to make your own observations and measurements. To have a shared circumstance for these observations, demonstrations will be made in most lectures. **You will need to attend every lecture to make and record your observations. Your lecture observations will be important for learning how to do physics and for your exams (which will have problems based on these demonstrations). Your lecture notes will be your primary course information source.**

b.) General Law: Your textbook provides some of the equations by which general law often is described in physics. Lecture will emphasize how equations come to be useful.

c.) Predictive Capability: Observed truth and general law often can be used for predictive purposes. Your textbook has applications of the general laws in examples. Lecture will have physics examples from daily life and some applications worked out.

2.) Study and make your own observations and estimates in the world around you every day. **Do not attempt to learn physics solely by reading the textbook or cramming before exams.** Typically, a minimum of two study hours per lecture hour are needed to learn physics. (Study time is time during which no electronic communication with others interrupts your focus. It also is recommended to have music and television off.). Read the text before lecture; study your notes and work book problems; make up your own problems from things you see around you. Meet with a couple other students to discuss problems after you have worked them. Work lots of problems.

3.) Expectations include skills and information you will acquire and the grades.

a.) Your analytical thinking skills for observing, estimating, predicting, and judging scientific correctness will increase. You will be able to use physics on a daily basis to improve your life. Your curiosity about nature will increase. Your understanding of the pervasive role of physics technology in society and its ever-increasing importance will help you see how to use physics and technology to advantage.

b.) Course grades will reflect the class talent pool. A typical class score distribution is close to a Gaussian (normal) distribution. A typical H90 distribution has about half the students in A grades range and about half in B grades range. Small percentages are below this. University physics exams often are written to have a distribution peak around 50%, not using 90/80/70/60 grade breakdowns so common in high school. Understand this paragraph so you do not have a concern about getting 40% on a test. A 50% score would not be failing, but rather likely would be near the class median, probably at the A-/B+ division.