Instructor: Barbara Andereck
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Office Hours: MTWRF 1:30-2:30 and by appointment
Texts: Modern Physics for Scientists and Engineers 3rd ed. by Thornton and Rex
       Underlying Physics by Barbara Andereck

The lecture portion of Contemporary Physics is designed to be a bridge between General Physics and the upper-level, theoretical physics courses. The purpose of the course is more than just the discussion of a given set of topics. You will be expected to learn new material, but in addition you will develop new skills that will serve you as a student of physics.

Learning Objectives:
1) To recognize and be able to explain how and why classical physics is incomplete.
2) To develop and enhance mathematical and physics skills, in particular those of
   a. estimation
   b. use of Mathematica
   c. comfort in constructing and evaluating integrals
   d. Fourier analysis
   e. matrix operations
3) To learn how to investigate a physics topic when the path is not laid out in a textbook
4) To think more and more like a physicist

Grading in this course will be based on a point system. Homework assignments, exams, a paper, feedback on my manuscript, and participation will all have point values. Homework will be due once per week and I expect you to work all of the assigned problems (to the best of your ability). In addition to assigned homework problems, there are suggested homework problems which will give you more practice with the concepts. These problems will not be turned in or graded, but some may be used (in modified form) on the exams. There will be three in-class exams and a comprehensive final exam.

We will be using my manuscript, Underlying Physics, this semester. You will find the “book” in BlackBoard. Although I have received feedback from past PHYS 280 classes and have made modifications based on their input, I still need significant feedback from you. I need to know what you understand and what you don’t understand. I need to know what is interesting and what is not. I need to know what I should change, what I should eliminate and what I should add. I need to know where I have typos or awkward sentences.

A six- to eight-page research paper on a topic relevant to “contemporary physics” will be due just after Thanksgiving break. If you would like to earn an "R" in this course you may write a longer paper (15 pages, 4000 words), confer with me during the development of the paper, and write multiple drafts. The schedule for steps in the writing process, most of which are to be followed by all students, not just those working toward an "R," is included on the Schedule. Ms Deb Peoples will provide an introduction to library research in the sciences. I will provide a handout on writing papers for physics classes that is designed to help you avoid unintentional plagiarism.

Participation points will be assigned for attending class and being on time (one point for each of these per class session).
An *approximate* breakdown of points for the various categories listed above is:

- Regular homework: 260
- Exam 1: 90
- Exam 2: 90
- Exam 3: 100
- Final Exam: 160
- Paper (including preliminaries): 100
- Manuscript feedback: 70
- Participation: 50

Grading scales for exams will be provided when the exams are returned. Grading scales for homework and the paper are similar to the exam grading scales. Manuscript feedback and participation grades cutoffs are at 90% for the A/B border, etc.

You will need to download *Mathematica*, which is available to OWU students on blog.owu.edu/software/. Login with your OWU username and password. Download *Mathematica* immediately, to be sure you don’t run into any problems.