Physics 375 Syllabus - Spring 2020
Professors Sarah Eno, Arpita Upadhyaya, Ellen Williams

**Course Title:** Experimental Physics III: *Electromagnetic Waves, Optics, and Modern Physics*

**Official Course Description**: *PHYS375 Experimental Physics III: Electromagnetic Waves, Optics, and Modern Physics; (3 credits) Grade Method: REG/P-F/AUD. Prerequisites: PHYS273 and PHYS276. Fourth course in the introductory sequence. Methods and rationale of experimental physics. Experiments chosen from the areas of electromagnetic waves, optics, and modern physics. Prerequisites are PHYS273 and PHYS276.*

**Instructors**
    Professor Sarah Eno, PSC 3164, eno@umd.edu, 301-405-7179
    Professor Arpita Upadhyaya, PSC 1151, arpitau@umd.edu, 301-405-9939
    Professor Ellen Williams, IPST 1111, edw@umd.edu, 301-405-3291

**Meeting times:**
    **Lecture: all sections, PHYS1401** - Monday 2:00 pm – 2:50 pm (Professor Eno)
    **Lab: all sections, PHYS 3115 3:00 pm – 5:50 pm**
                **Section 0101** - Monday (Professor Eno)
                **Section 0201** - Tuesday (Professor Upadhyaya)
                **Section 0301** - Wednesday (Professor Upadhyaya)
                **Section 0401** - Thursday (Professor Williams)

**Office Hours:** We are happy to meet with you!  Contact us with an email and we'll find a time that is convenient for both of us.  Meeting with your instructor to discuss your work outside of the classroom is one of the best ways to get the most out of your educational experience.

**Teaching Assistant**:  TBA

**Required Texts:**
-   "Optics**,** by Eugene Hecht ( any edition of "Optics" by Hecht).  ISBN 978013977226
-   You may find https://www.gnu.org/software/octave/ for practice with MATLAB.  This product is free.
-   You may find MATLAB at https://www.mathworks.com/products/matlab.html , but it is not required.
-   UMD has MATLAB licences for everyone through terpware so for people who have activated that license and have created a Mathworks (the creators of MATLAB) account, they can navigate to "matlab.mathworks.com" and login using the UMD-Mathworks credentials made from their terpmail account.

    **Recommended Texts:**
    •   Elements of Style, Struck and White, ISBN-13: 978-0205309023
    •   A practical guide to data analysis for physical science students, Louis Lyons, ISBN-13:9780521424639
    •   Statistical Data Analysis, Glen Cowan, ISBN-13: 978-0198501565

**Grading:**     40 %  "Notebook" and accompanying files
15 %  formal lab report
20 %  homework
12.5 %  midterm exam
12.5% final exam

**Overview:** PHYS375 is a three (3) credit course that meets four hours a week.  The primary laboratory objective consists of learning physics through experimental investigation. Topics to be covered include electromagnetic waves, geometrical optics, polarization, interference and interferometers, diffraction, and atomic spectra. Each lab will include a substantial lecture component on Monday.

This is one of the few opportunities in our undergraduate curriculum to learn some geometrical and wave optics. You will also learn how to carefully take data, analyze it, understand the origins and propagation of errors, and to better appreciate the subtleties of experimental physics. You will also continue improving your ability to produce useful written presentations of scientific results.

**Lectures:** The lectures are a required component of this class. This is an excellent opportunity to learn optics and to make connections to your other courses (electromagnetism, quantum mechanics, etc.) and deepen your understanding of physics. Important topics directly related to the lab will be covered in lecture.   The two exams will primarily draw from material covered in the lecture.

**Computers**: Developing a working knowledge of computers in the context of physics problem solving is an important skill. You will accumulate and analyze data with a computer-based system using MATLAB. We will provide some elementary MATLAB code for use in data collection and analysis.

**Lab Notebooks and Reports**: For all labs, you will be required to submit a NOTEBOOK containing notes taken while performing the lab, along with accompanying files detailed in the lab.  For one of the labs, you will need to submit a FORMAL LAB REPORT.  Details on the requirements for the notebook and files, and the formal lab report, can be found in the "Files" section of ELMS.  Please read the grading rubrics carefully so you will know what is required. You are unlikely to receive a good grade if you do not check the requirements first.

**Homework**: Homework will be assigned via ELMS. This material is designed to compliment the lecture and laboratory segments of the course. Late homework will not be accepted and will receive a grade of 0.  Please hand in paper copies of your homework on Mondays during lecture. The TA will check that all the problems have been completed and will choose 1 problem to grade.  The homework grade will be a weighted average of the completion grade (40% weight) and the grade from the 4 problems (60% weight).

**Exams:** There will be two exams, a midterm and a final.  They will consist of problems similar to your homework problems and calculations similar to those you did as part of your laboratory work.

**Nitty Gritty:**
*Please do not bring any food or drink into the lab under any circumstances*. This includes water, in any kind of container.

**University policies:**  An official list of University academic policies can be found at: http://www.ugst.umd.edu/courserelatedpolicies.html.  Please see this list for policies on University-recognized reasons for missing a class, policies regarding academic integrity including plagiarism, and other matters.

**Disabilities:**   If you have a documented disability and wish to discuss accommodations, please contact me as soon as possible.

**In case of Bad weather**: Winter in the Washington Metro area can bring large snowstorms that make travel dangerous. Should this happen and the University is closed as a result during a scheduled lab, class will be cancelled, and we will most likely reschedule the lab for the following week.

**Disclaimer:**

The instructor reserves the right to make minor changes to this syllabus to meet the specific needs of the class during the semester. Any changes will be announced in ELMS.