

# Syllabus for Physics 107 - Spring 2013 - Professor Fred Wellstood

## Light, Perception, Photography and Visual Phenomena Laboratory

**Official Course Description:** PHYS107 **Light, Perception, Photography and Visual Phenomena Laboratory; (1 credit)** Grade Method: REG/P-F/AUD. *CORE Distributive Studies Physical Sciences Laboratory Course only when taken with PHYS 106. Pre- or corequisite: PHYS106. Credit not applicable towards the minimum requirements for a major in physics and astronomy.* Optional laboratory to accompany PHYS106. Laboratory experiments include geometrical optics (lenses, cameras, eye), optical instruments (telescope, binoculars), photography, perception, color phenomena, and wave phenomena.

**Corequisite:** PHYS 106.

**Required Text:** Physics 107 Lab Manual, Fall 2010 Edition

**Meeting the CORE Distributive Studies Requirement:** Please note that if you are enrolled in Physics 107 and you want to receive credit for a CORE physical sciences laboratory course, you must also be enrolled in Physics 106.

**Instructor:** Dr. Fred Wellstood  
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**About the Instructor:** Dr Wellstood is a Professor of Physics at UMD who does research on superconducting devices and quantum computing. In the spring semester, he is also teaching a section of Physics 375 and is responsible for several graduate students who are conducting ongoing research projects. You can always try stopping by his research office (Room 0367 Physics Building) at any time, but the easiest way to reach him is usually by sending e-mail to [well@squid.umd.edu](mailto:well@squid.umd.edu).

### **Teaching Assistant:**

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### **Laboratory Sections:**

0101 Monday	3:00pm- 4:50pm	(PHY 3214) Lab
0301 Tuesday	1:00pm- 2:50pm	(PHY 3214) Lab
0501 Wednesday	3:00pm- 4:50pm	(PHY 3214) Lab

**Course Outline:** The Physics 107 lab meets once per week and consists of 11 experiments which are described in detail in the Physics 107 Lab Manual. Make sure that you get the lab manual before your section meets for the first time.

Before you lab starts, read through the lab manual for the week's lab and complete the Prelab Assignment (see the section below on the Prelab Assignments). Each lab session lasts two hours and begins with a quiz. After the quiz there will be a brief introduction by your TA. Typically the full lab time is required to complete the experiment, and you will not be able to finish on time if you are not prepared yourself beforehand by reading through the lab manual. At the end of the lab session you need to turn in a lab report (see the section below on the lab report)

**Quizzes** are picked up as you enter the lab and are due five minutes after the start of class. The quizzes will typically have one or two simple questions about the experiment you will be doing. To prepare for the Quiz, you need to read the lab manual before doing the experiment. If you are late for class, you will miss the quiz and lose points.

**You Need to Answer the Prelab Questions** before the start of each of your lab sessions, with the exception of Lab 1 which does not have Prelab Questions. The Prelab questions are found in the lab manual at the beginning of each experiment. You need to submit your answers to the Prelab questions using the ELMS/Canvas system before the deadline. Just go to: <https://myelms.umd.edu/login>

The pre-lab questions count towards your grade and answers will not be accepted for credit after the lab has begun - the whole point of the prelab questions is to get you to prepare for the lab before you do it.

### **Lab Reports**

- **Every student must turn in their own lab report at the end of each lab class.**

Your lab reports should be brief and include:

1. Your name, the experiment number, and the name of the experiment
2. Your lab partner's name
3. The date
4. A two or three sentence summary of the experiment
5. The data you collected
6. Any analysis, plots or sketches
7. Answers to all the questions

Typically you will work with a lab partner to collect data, so that two people will typically share the same data set. Groups of more than 2 are not allowed. You are encouraged to discuss your results and analysis with other students in the lab, but each student needs to perform their own analysis, answer the questions, and write up and submit their own report. You will need to bring your own paper on which to write up the lab.

- **At the end of each lab period, each student must turn in their own lab report.** The lab manual contains instructions for each lab and also has a series of questions that you are supposed to answer as you work through the lab. Your lab report should answer these questions using full sentences and your answers should be self-contained. It should not be necessary for the grader to refer to the lab manual in order to determine what it is you are trying to answer or explain. Answering a question with just a number or just "yes" or "no" is never enough to receive full credit. Use proper grammar and spelling. Be careful. As you read the lab, make sure that you find all the questions, and that you answer them fully, completely, and neatly.
- **Every student must turn in their own Lab Report at the end of each lab class.** Does it seem like we are repeating ourselves? It is required that you personally hand your report to your instructor before leaving the classroom - no one else is allowed to turn in your report for you. Make sure that your instructor checks off your name so that in the unlikely event that your report is misplaced, we have a record that you turned it in. Late lab reports will not be accepted under any circumstances.

### **Making up labs**

If you miss a lab, you should try to make it up the same week by going to another section. It is up to the TA to admit you to the section, subject to the availability of space. If you cannot make up a lab in the same week, then you must schedule to make up the lab during one of the two

scheduled make-up times (see schedule below). If you miss one of the first 5 experiments, you must make it up during the first makeup week.

### **Grading:**

Prelab Assignments for Labs 2 through 11	2 points each →	20 points total
Quizzes for Labs 2 through 11	2 points each →	20 points total
Lab Reports for Labs 1 through 11:	10 points each →	110 points total
TOTAL		150 points

- Standard grading will be used (i.e. 90%-100% of total possible points is an A, 80%-90% is a B, 70%-80% is a C, 60%-70% is a D, less than 60% is an F). However, a standard curve will be employed if the average grade in sections graded by different graders differs by more than 20%, or if standard grading results in fewer than 20% or more than 40% A's in the class as a whole.

- Be sure to complete all the labs! Failure to complete a lab will decrease your final score by about one letter grade for each lab that you miss. Each of the labs carries the same weight in your final score.

- For each lab report, three points will be awarded for each distinct question, drawing, graph, required data set, etc. Partial credit is awarded if an answer is not entirely correct or complete. Your score for each report will be then found from the percentage of points earned within the report. This means that labs that contain more questions do not count more toward your grad than labs with fewer questions.

### **General Advice**

Don't forget that the Prelab Assignments are due at the start of each lab, with the exception of Lab 1 which does not have a Prelab assignment. To turn your Prelab Assignment, you need to log onto ELMS and click on the link for Physics 107. It would be smart not to wait until the last minute to do this.

Classes at Maryland start right on the hour and students are expected to be in the lab when the period begins. Don't be late. You will need to complete your quiz in the first five minutes of class and then your instructor will say a little bit about the lab in the next five or ten minutes. If you miss the quiz and the introduction, then you may have to attend a later section or make up the lab.

When you are working on an experiment, by all means have fun, but try to keep focused on your work. You have two hours to finish up and, although that leaves some time for playing and making mistakes, you'll find that it's not a lot of time.

Save all of your old prelabs, quizzes and lab reports until at least you have received your final grade in the class. Mistakes (missing scores) can happen, and the best defense is saving copies of all your work.

**Important Dates for Spring 2013 (Preliminary)**  
**Physics 107 - Optical Phenomena**

Week	Date	Experiment / Event	Experiment Title
1	Jan. 23	First day of classes	-
	Jan. 23-25	no labs this 1st week	-
2	Jan. 28- 31	Experiment 1	Camera Obscura
3	Feb. 4-7	Experiment 2	Pinhole Camera
4	Feb. 11-14	Experiment 3	Light: Reflection, Mirrors and Images
5	Feb. 18-22	Experiment 4	Light: Refraction
6	Feb.25- 28	Experiment 5	Images: Shaped Surfaces, Simple Lenses
7	March 4-7	Experiment 6	More Simple Lenses
8	March 11-14	Makeup Labs 1-6	Makeup Labs for experiments 1-6
9	March 18-22	no labs this week	Spring Break
10	March 25-28	Experiment 7	The Digital Single Reflex Camera
11	April 1-4	Experiment 8	Polarized Light and Birefringence
12	April 8-11	Experiment 9	Light: Interference
13	April 15-18	Experiment 10	Light: Diffraction
14	April 22-25	Experiment 11	Diffraction Gratings, Color and Holography
15	Apr. 29-May 2	Makeup 7-11	Makeup for experiments 6-11
16	May 6-9	-	additional make-up sessions if necessary
	May 9	last day of classes	
17	May 11-17	Final Exams	there is no final exam in the Physics 107 Lab