

Course Syllabus

Physics 360: Optics

Spring Semester 2018

Instructor:	Dr. Steven Sahyun
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E-mail:	sahyuns@uww.edu
WWW:	http://sahyun.net/courses/physcs360
Desire2Learn:	https://www.uww.edu/desire2learn
Class Meetings:	M W F 11:00 a.m. – 11:50 a.m.
Laboratory:	F 1:00 - 3:50 p.m.
Office Hours:	M W 1:00 – 3:30 p.m. or by appointment.
Exams:	Midterms: 2/23, 3/23 Final: May 16, 10:00 a.m. – 12 noon.
Presentations:	Presentations: 3/7, 4/11, 5/9 (Lab Project)
Field Trip:	4/20 (tentative!!)
Text:	Required: Kenyon: <i>The Light Fantastic</i> , 2 nd ed. Required: OpenStax, <i>University Physics Vol. 3</i> . PDF download from D2L or https://openstax.org/details/books/university-physics-volume-3 Recommended: Poon and Kim, <i>Engineering Optics with MatLAB</i>
Pre-requisite:	Physics 324 or consent of instructor.

Note: The last day to drop classes is Feb. 2 (no ‘W’); March 2 (‘W’ grade.)

Other required materials: We will be using LabArchives as an Electronic Laboratory Notebook (ELN) for recording data and posting laboratory reports. You are expected to bring an additional laboratory notebook of your choice to lab for working out calculations and recording notes when it is inconvenient to use the ELN and then transfer (copy, scan, or photo) the information into the ELN. Paper, a scientific calculator (one with trigonometric and logarithmic functions, scientific notation, etc.), and a data storage device (USB recommended). Calculators and USB drives are available for less than \$20).

Recommended materials:

MATLAB: Because of the prevalent use of MatLAB in industry and research labs, and because our UWW physics alumni have mentioned that it is something that our majors should know when graduating, it is the intention that we will be using MatLAB for several assignments and in-class activities. The Physics Department has access to MatLAB on its computers, but you may find it useful to purchase a student edition of MatLAB (\$93) through WISC at <http://wiscsoftware.wisc.edu/wisc/school.asp?institution=1024> or through the www.mathworks.com site (30 day free trial; student edition \$50; with Simulink \$99). The university is working on obtaining a site license for MatLAB so you may be able to download this for free at some point.

A **FREE** alternative to MatLAB is **GNU Octave**:
<https://www.gnu.org/software/octave/download.html>

Most MatLAB scripts will work in Octave (and vice versa), though there are some graphing differences. MatLAB assignments or work is to be submitted in working MatLAB scripts, but most development may be in Octave if you do not have access to MatLAB. As long as I can get the scripts to work on my computers for evaluation purposes on MatLAB, you may use either program.

Office: Also, as a student, you can get Microsoft Office ProPlus for free at <http://www.uww.edu/icit/4u/proplus>. This is a great deal. Recommended free alternatives that can open/save most Word, Excel, and PowerPoint files are OpenOffice (<http://www.openoffice.org/download/index.html>) and LibreOffice (<http://www.libreoffice.org/download>)

Course Description: This course provides an introductory study of optical phenomena. Geometrical and physical optics beginning with a mathematical treatment of light waves and their interaction with materials. Topics also include interference diffraction, spectroscopy and spectroscopic instruments, polarization, light sources and detectors, lasers, holography, and some topics in modern optics. The laboratory portion of the class will provide hands-on experience for topics discussed.

Class Pedagogy: Much Physics Education research has shown the worth of active learning classroom strategies. This course will attempt to implement these as much as possible through the use of student presentation of material, in-class activities, and discussion sessions. A result is that there will be (hopefully) very little of me deriving equations on the board. There are many excellent sources of notes on the Web relating to material that we will cover (for example I highly recommend <http://physics.tamuk.edu/~suson/html/4323/>) to satisfy your desire for additional notes.

All personal electronic devices not required for note taking or calculation (e.g., cell phones, pager, iPods, etc.) must be turned off while in class. Texting or using a cell phone during class is **NOT PERMITTED**. It is distracting and causes other members of your group to be disturbed during the class lecture and activities.

Daily Readings: Read the assigned sections (listed on the course Web site) in the book before coming to class. You will be expected to provide a reading summary (to be graded) at the beginning of class. You may use notes when writing your reading summary. Write down one question that you have related to the assigned material for discussion.

Homework: Each class period your will be expected to have completed the homework problem assigned for the day as noted on the class schedule (<http://academics.uww.edu/physics/courses/physcs360/schedule.pdf>) You will turn your solution at the start of class for credit. Late homework will receive half-credit.

Activities: There will usually be a graded in-class activity. You will turn in your results sheet for the day's activity at the end of the class period. Due to the nature of some of the in-class activities, it may not be possible to offer make-up on these, but when possible, you may make up missed activities at the earliest appropriate time.

Presentations and papers: There will be two 5-minute presentations assigned during the course. The presentations will be an oral report of your research papers on different topics (Optics catalog item, Photonics magazine article). The presentation will be about your paper to the rest of the class. For each presentation, you will provide a 1-page paper that will be distributed to the rest of the class as well as be graded. Late papers will be graded at half credit; there will be no credit for late/no presentations. There will also be one 10-minute presentation on your chosen optics project. This project will have a two-page paper that describes your project and results and will be distributed to the rest of the class as well as graded.

Exams: There will be two mid-term exams as well as a comprehensive final. Exams may not be taken late. Questions for the exams will be similar to submitted homework problems and items seen in the in-class activities.

I will provide a TI 30X IIS or similar calculator for use during exams. If you have a similar calculator that you would like to use as an alternate, it must first be checked and approved by me prior to the exam. No other electronic devices are allowed during exams. **NO CELL PHONES ARE ALLOWED DURING EXAMS.** You will not be allowed to use a cell phone as a calculator during the exams or have your cell phone available.

Laboratory: The laboratory is a required portion of the course. Each lab will be a three-hour session. Plan on attending each session for the laboratory.

We will be **testing** out using an electronic laboratory notebook (ELN) method at <https://mynotebook.labarchives.com> to record work in the laboratory.

A video tutorial about LabArchives enotebook is at:

https://www.youtube.com/watch?feature=player_embedded&v=DmMd0AA8GG4

It is possible to access your LabArchives notebook from a smart phone or tablet.

Since the ELN is new, you should also have a lab notebook (preferably bound) for recording your experiments and data. Your ELN will be evaluated (for part of the lab grade) at the end of each lab for good record keeping. [For those having taken PHYSCS 221: Intermediate Lab; the reports will similar in style but be less extensive in nature as they will be weekly reports. You may continue to use your lab notebook from PH221.]

Laboratory Reports:

Each laboratory will have a typed report and follow a grading rubric given below. Laboratory reports are due **FRIDAY** of the week after lab completion. Reports are to be

submitted on LabArchives. There is a LaTeX template on D2L for your reports. LaTeX is recommended but not required for the reports. Each student will submit their own laboratory report for the first laboratory, but other reports may be submitted as group reports. Lab notebooks will remain as separately graded items for each student. [For example, if a group report is submitted, but there is no lab notebook information on LabArchives, you will not receive credit.] Group reports must contain the names of all students who contributed and each student must make significant contributions to each report. Reports will be reduced by 1 pt. **each** day they are late.

After receiving your laboratory grade, you may rewrite and resubmit your laboratory report for a re-grade. The rewrite is due one week after the original was graded.

To pass the course, you MUST complete 8 of the 10 laboratory experiments (assuming there are no technical problems with the experiments and that there are 8 experiments offered) **as well as** complete the final laboratory project of your own design. If you miss a laboratory, you may use one of the days reserved for your project to work on the lab make-up. If you complete fewer than 6 laboratory experiments (assumption as noted above) you will NOT receive a passing grade.

Campus Policies and Practices Statement

Course Policy Regarding Video/Audio Recording:

In order to encourage a classroom environment where the free exchange of ideas is possible, video and audio recording must be limited to that done for educational purposes. Prior instructor permission and notification of fellow students is required for any video or audio recording.

Per UW-W policies and practices, if and when certain information is learned, whether in an academic program, residence life or other campus activity, the person (UWW employee) who learns that information is required to report if the information includes any form of sex discrimination, violence, abuse or neglect, past or present. If you share something personal that falls within one of the categories above, thereby requiring the instructor or staff person to report what was shared. If this occurs, the staff person will use discretion, reason and sensitivity to abide by our policies while respecting your privacy. The goal of these requirements is to prevent or avoid further harm to you, as a student, or those who may be exposed to further abuse by others. If you have questions or concerns, you are encouraged to talk with your course instructor or department chair.

The University of Wisconsin-Whitewater is dedicated to a safe, supportive and non-discriminatory learning environment. It is the responsibility of all undergraduate and graduate students to familiarize themselves with University policies regarding Special Accommodations, Misconduct, Religious Beliefs Accommodation, Discrimination and Absence for University Sponsored Events. (For details please refer to the Undergraduate and Graduate Timetables; the "Rights and Responsibilities" section of the Undergraduate Bulletin; the Academic Requirements and Policies and the Facilities and Services sections of the Graduate Bulletin; and the Student Academic Disciplinary Procedures" [UWS Chapter 14]; and the "Student Nonacademic Disciplinary Procedures " [UWS Chapter 17]).

The following is the tentative form that I will use to evaluate your laboratory reports:

Physics 360 Optics Laboratory **Report Grade**

Fall 2014

Name: _____ Lab _____

Lab Book: Laboratory notebook has a reasonable record of the experiment performed. Diagram of apparatus set-up, data (for file location), and statements of what is being done are shown.	0 1 2
I. Objective/Introduction: The introduction explains what the experiment is about.	0 1 2
II. Theory: There is a coherent THEORY section that clearly shows how the theory relates to the experiment.	0 1 2 3 4
III. Set-up: The experimental set-up clearly described and any necessary figures included.	0 1 2
IV. Data Results: The acquired data are clearly reported. Graphs of acquired data or other presentation if appropriate are shown.	0 1 2 3 4
V. Analysis and Interpretation: There is a clear and correct analysis and interpretation of what your data indicates and commentary of the results.	0 1 2 3 4
VI. Conclusion: Your final results including experimental uncertainty ranges are clearly stated.	0 1 2
Total:	/ 20

Notes:

There will be up to a 2 pt. deduction for a poorly written (grammar/spelling) report.
There is a late fee of 1 pt. per day.

Grading: Course grades will be determined by the percentage of **total** points assigned for the course. 93% = A, 90% = A-, 87% = B+, 83% = B, 80% = B-, 77% = C+, 73% = C, 70% = C-, 67%=D+, 63% = D, 60% = D-, <60% = F.

The **approximate** assignment of points will be as follows:

Item	Points	%
Exam 1	40	8%
Exam 2	40	8%
Final	80	15%
Presentations (2@10pts)	20	4%
Presentation papers (2@10pts)	20	4%
Participation: in- class activities (26@2pts)	54	10%
Homework Probs (27@2pt)	54	10%
MatLAB projects (3@10 pts., 1@5 pts.)	35	7%
Lab Reports (8@20pts)	160	30%
Project presentation (1@10pts) and report paper (1@20pts)	30	6%
Total	533	100%

I reserve the right to adjust grades slightly based on class participation. There may be occasional opportunities for extra credit.

EXAMINATION SCHEDULE SPRING TERM 2018

FINAL EXAMINATION POLICY

All instructional staff of on and off-campus classes are expected to meet during their scheduled final examination period. All comprehensive final examinations shall be administered at the prescribed time during the final examination period. For those classes where there is no final examination, the time prescribed during the final examination period shall be used as a regular class meeting. Exception to meeting classes during the examination period requires specific written approval in advance from the college dean.

No student shall be required to take more than two comprehensive final examinations on the same day. Any student with more than two comprehensive final examinations scheduled on the same day who want to reschedule the excessive examination(s) must make arrangements with the instructors involved. If the student and instructors are unable to reach mutual agreement about alternate arrangements, the student must notify the Registrar by Friday, February 23rd. The Registrar shall arrange times as necessary with instructors involved and shall notify the student of the arrangements by Monday, April 9th. This policy covers only comprehensive final examinations given during the final examination period.

- Final examinations for web-based classes are scheduled during finals week at the discretion of the instructor.
- Courses meeting four or five periods a week, i.e. MTWTF, may use either the MWF or TR period for the exam, whichever is most convenient for all concerned, unless otherwise stated.
- Classes scheduled MW, MF, or WF are to follow the MWF exam times unless otherwise stated.
- Examinations in off-campus evening classes are scheduled for the regular class meeting time that falls during the examination week that begins Monday, May 14th.
- Classes offered at non-standard class times do not have designated final examination periods. Instructors are to make arrangements to administer examinations during the Monday, May 21st exam times.

Monday, May 14, 2018

7:45-9:45 a.m. MWF or MW classes beginning between 8:00-8:50 a.m.
10:00-12 Noon MWF or MW classes beginning between 10:00-10:50 a.m.
12:15-2:15 p.m. MWF or MW classes beginning between 12:00-12:50 p.m.
2:30-4:30 p.m. MWF or MW classes beginning between 2:00-2:50 p.m.
4:45-6:45 p.m. M or MW classes beginning between 4:00-6:25 p.m.
7:00-9:00 p.m. M or MW classes beginning 6:30 p.m. or later

Tuesday, May 15, 2018

7:45-9:45 a.m. TR classes beginning between 8:00-8:50 a.m.
10:00-12 Noon TR classes beginning between 10:00-10:50 a.m.
12:15-2:15 p.m. TR classes beginning between 12:00-12:50 p.m.
2:30-4:30 p.m. TR classes beginning between 2:00-2:50 p.m.
4:45-6:45 p.m. T or TR classes beginning between 4:00-6:25 p.m.
7:00-9:00 p.m. T or TR classes beginning 6:30 p.m. or later

Wednesday, May 16, 2018

7:45-9:45 a.m. MWF or MW classes beginning between 9:00-9:50 a.m.
10:00-12 Noon MWF or MW classes beginning between 11:00-11:50 a.m.
12:15-2:15 p.m. MWF or MW classes beginning between 1:00-1:50 p.m.
2:30-4:30 p.m. MWF or MW classes beginning between 3:00-3:50 p.m.
4:45-6:45 p.m. W only classes beginning between 4:00-6:25 p.m.
7:00-9:00 p.m. W only classes beginning 6:30 or later

Thursday, May 17, 2018

7:45-9:45 a.m. TR classes beginning between 9:00-9:50 a.m.
10:00-12 Noon TR classes beginning between 11:00-11:50 a.m.
12:15-2:15 p.m. TR classes beginning between 1:00-1:50 p.m.
2:30-4:30 p.m. TR classes beginning between 3:00-3:50 p.m.
4:45-6:45 p.m. R classes beginning between 4:00-6:25 p.m.
7:00-9:00 p.m. R classes beginning 6:30 p.m. or later

Friday, May 18, 2018

7:45-9:45 a.m. F only classes beginning between 8:00-9:55 a.m.
10:00-12 Noon F only classes beginning between 10:00-11:55 a.m.
12:15-2:15 p.m. F only classes beginning between 12:00-1:55 p.m.
2:30-4:30 p.m. F only classes beginning between 2:00-3:55 p.m.
4:45-6:45 p.m. F only classes beginning between 4:00 p.m. or later

Saturday, May 19, 2018

Saturday classes should hold exams during the meeting time that falls during exam week

Sunday, May 20, 2018

Sunday classes should hold exams during the meeting time that falls during exam week

Monday, May 21, 2018

7:45-9:45 a.m. Courses offered at a non-standard start time and
10:00-12 Noon Special makeup exams for on-campus students if authorized by instructor
1:00-3:00 p.m.
3:15-5:15 p.m.

FINAL GRADES DUE IN WINS BY TUESDAY, MAY 22 - 4:00 PM