

Course Syllabus

PC237 Optics

Physics and Computer Science Department, Faculty of Science, Waterloo Campus
Winter | 2020

Instructor Information

Name: Dr. Li Wei | Office Location N2084B

Contact Information: Phone 519-884-0710 ext. 2903, lab ext. 6610: Email: lwei@wlu.ca

Weekly Office Hours: Friday 9:00 – 10:00 am in N2084B or by Appointment

Lab Instructor Information

Name: Terry Sturtevant | Office Location N2092A

Contact Information: Phone 519-884-0710 ext. 2049, Email: tsturtevant@wlu.ca

Course Information

Course Overview

Topics covered in the course includes nature of light: Huygen's principle, Fermat's principle, geometrical optics: reflection and refraction at plane and curved surfaces, lenses and lens systems, and wave optics: interference, diffraction, polarization. Optics is a very active field with diverse applications in physics, chemistry, life science, medicine, military, communications, etc.

Credit: 0.50

Prerequisite: PC131, PC132 (or PC141, PC142) and one of MA101 or MA110* or MA103 or MA105.

Course location, meeting times and days

Section	Days	Times	Room	Instructor
Lecture	TR	1:00 pm - 2:20 pm	N1059	Li Wei
Lab L1	R	9:30 am - 11:20 am	N2088	Terry Sturtevant
Lab L2	R	3:30 pm - 5:20 pm	N2088	Terry Sturtevant

Course Goals and Learning Outcomes

The main objective of this course is to develop a fundamental understanding of the light nature. This goal is achieved through a study of geometrical and wave (physical) optics. The former is used in tracing the light ray paths in optical systems and describes the formation of images. The latter explains such amazing

phenomena as interference, diffraction and polarization of light. By the end of the course students should be able to understand the design of simple optical instruments, solve optical problems, and appreciate the breath of optics applications.

Course Textbook

Optics, Eugene Hecht, Pearson Education, 5th Edition. Old editions are satisfactory, but references and problem numbers may be wrong.

Suggested Reference: *Introduction to Optics*, any edition, by Pedrotti and Pedrotti.

Course Web Page: <http://bohr.wlu.ca/lwei/PC237/index.html>

Lab Website: <http://denethor.wlu.ca/pc237/index.shtml>

Student Evaluation for PC237

Assessment	Weighting
Assignments	15%
Midterm exam	25%
Final exam	40%
Lab	20%
Total	100%

Learning Activities, Assignments, and Examinations

Please note that the course notes, assignments and exam information will be posted on our course website (<http://bohr.wlu.ca/lwei/PC237/index.html>). The midterm exam is tentatively scheduled on Feb. 27. It will be held in class.

There are 5 assignments. In general, the assignments will be posted one week on our course website (<http://bohr.wlu.ca/lwei/PC237/index.html>) in advance of their due date. You can submit your assignment (in paper form) in class on the due date; if you could not make it to class on that day, you could scan your assignment and submit it via email (lwei@wlu.ca).

The assignments will help students to understand the materials and prepare them for the exams. Assignments, and examples discussed during lectures will help students to answer the questions in the final exam.

Weekly Lecture Schedules

1. Electromagnetic Theory, Photons and Light (Chapter 3)
2. The Propagation of Light (Chapter 4)
3. Geometrical Optics (Chapter 5)
4. Wave motion, The superposition of Waves (Chapter 2, Chapter 7)

5. Interference (Chapter 9)
6. Diffraction (Chapter 10)
7. Polarization (Chapter 8)

Week 1	Chapter 3 and Chapter 4	
Week 2	Chapter 4	
Week 3	Chapter 4	Assignment 1
Week 4	Chapter 5	
Week 5	Chapter 5	
Week 6	Chapter 2 and 7	Assignment 2
Week 7	Midterm	
Week 8	Chapter 9	
Week 9	Chapter 9	Assignment 3
Week 10	Chapter 9 and Chapter 10	
Week 11	Chapter 10 and Chapter 8	Assignment 4
Week 12	Chapter 8 and Summary	

Please be advised this schedule may be subject to change slightly.

University and Course Policies

Laurier has several senate approved policy statements it requires instructors to include in their syllabus. Those with specific wording approved by senate are indicated specifically below.

1. **Academic Calendars:** Students are encouraged to review the [Academic Calendar](#) for information regarding all important dates, deadlines, and services available on campus.
2. **Special Needs:** Students with disabilities or special needs are advised to contact Laurier's Accessible Learning Centre for information regarding its services and resources.
3. **Plagiarism:** The University has approved the following wording for inclusion on all course syllabi about the use of the institutionally supported plagiarism software tool. "Wilfrid Laurier University uses software that can check for plagiarism. If requested to do so by the instructor, students are required to submit their written work in electronic form and have it checked for plagiarism." (Approved by Senate May 14, 2002).
4. **Academic Integrity:** Laurier is committed to a culture of integrity within and beyond the classroom. This culture values trustworthiness (i.e., honesty, integrity, reliability), fairness, caring, respect, responsibility and citizenship. Together, we have a shared responsibility to uphold this culture in our academic and nonacademic behaviour. The University has a defined policy with respect to academic misconduct. As a Laurier student you are responsible for familiarizing yourself with this policy and the accompanying penalty guidelines, some of which may appear on your transcript if there is a finding of misconduct. The relevant policy can be found at Laurier's [academic integrity](#) website along with resources to educate and support you in upholding a culture of integrity. Ignorance is not a defense.
5. **Classroom Use of Electronic Devices:** State your classroom practice and any consequences for student failure to comply – see [Policy 9.3](#) (Approved by Senate March 8, 2012).

6. **Late Assignment Policy:** Specify any penalties that will be assessed when deadlines for the completion of course components are not met (Approved by Senate May 23, 2012). Refer to the Handbook on Undergraduate Course Management for more information.
7. **Final Examinations:** Students are strongly urged not to make any commitments (i.e., vacation) during the examination period. Students are required to be available for examinations during the examination periods of all terms in which they register. Refer to the Handbook on Undergraduate Course Management for more information.
8. **Foot Patrol, the Wellness Centre, and the Student Food Bank:** The University approved the inclusion of information about select wellness and safety services and supports on campus in the course information provided to students. (Approved by Senate November 28, 2011.) Specific language (by campus) is provided below.

Multi-campus Resource:

- Good2Talk is a postsecondary school helpline that provides free, professional and confidential counselling support for students in Ontario. Call 1-866-925-5454 or through 2-1-1. Available 24-7.

Kitchener/Waterloo Resources:

- [Waterloo Student Food Bank](#): All students are eligible to use this service to ensure they're eating healthy when overwhelmed, stressed or financially strained. Anonymously request a package online 24-7. All dietary restrictions accommodated.
- [Waterloo Foot Patrol](#): 519.886.FOOT (3668). A volunteer operated safe-walk program, available Fall and Winter daily from 6:30 pm to 3 am. Teams of two are assigned to escort students to and from campus by foot or by van.
- [Waterloo Student Wellness Centre](#): 519-884-0710, x3146. The Centre supports the physical, emotional, and mental health needs of students. Located on the 2nd floor of the Student Services Building, booked and same-day appointments are available Mondays and Wednesdays from 8:30 am to 7:30 pm, and Tuesdays, Thursdays and Fridays from 8:30 am to 4:15 pm. Contact the Centre at x3146, wellness@wlu.ca or @LaurierWellness. After hours crisis support available 24/7. Call 1-844-437-3247 (HERE247).