

Course Description: Physics 325: Optics

Carl Adams

September 9, 2011

1 Contact Information & Office Hours

Carl Adams, Rm 1006 Physical Sciences Complex, 867-5337, in research lab PS 1070, or in undergrad labs 1012 or 1067. Email: cadams@stfx.ca. I am usually teaching, in my office or lab from 9 to 5 each day with the possible exception of Tuesdays and Fridays 1st term. Formal office hours

- Monday 10:15-12:05
- Wednesday 10:15-11:05, 1:15-2:05
- Thursday 9:15-10:05, 11:15-12:05

Website <http://www.stfx.ca/people/cadams/> and follow the links.

2 Summary

This course deals with the study of light. We will discuss the nature of light, geometric optics, lenses, Fermat's principle, optical devices, interference, diffraction, coherence, and lasers. An experimental lab is an important part of this course.

3 Text and References

Introduction of Optics 3rd edition by Frank Pedrotti, Leno S. Pedrotte, and Leno M. Pedrotti (commonly called "Pedrotti cubed") by Pearson Education. Another useful reference is *Optics* by Eugene Hecht which is on my outside shelf.

4 Grading Scheme

The final grade will be determined as follows:

December Exam	40%
Oct. 24 Midterm	15%
Assignments (4)	20%
Labs	25%

5 Policies

1. I draw your attention to Section 3.8 of the Academic Calendar **Academic Integrity Policy** and online at <http://www.stfx.ca/services/registrar/policies>
2. Lab books will be taken in on Thursdays after the Monday lab.
3. Assignments are due at the beginning of class if there is a class on the due date and by 4 p.m. if there is no scheduled class that day. The assignment mark will be penalized by 10% for each teaching day the assignment is late after the due date up to a maximum of one week. After one week or if in special circumstances where I circulate solutions prior to that time (a warning will be given) the assignment will be worth zero. (I may still mark the assignment if you would like to see how well you did.) I will do my best to return the assignments within 10 days or sooner. A considerable portion of the midterm and exam questions will be based on assignments and examples covered in class and in the book so it is very important that you understand these solutions.
4. There are no scheduled tutorials for this class but if the class wishes I will try to arrange for a question and answer doughnut period prior to the midterm.
5. Exams and midterms will be closed book but I will provide a formula sheet. You will have access to the sheet prior to the tests.
6. I don't have any control over the exam schedule. Do not schedule any plane flights that cause you to miss exams!
7. At my discretion I may adjust the class marks upward on an exam or midterm to bring them in-line with academic norms ("scaling the marks").
8. At my discretion I round up part marks for the individual grades you receive. If the final mark is "close" to a multiple of 10 I may add up to 1.2 marks. I may add up to 2 marks to bring your final up to 50%. But that is it. I have no problem looking over your marks to check and see if I made a mistake but I don't just "add marks" because you ask me to (aside from the above cases). There is a formal appeal policy (Section 3.13 of the Academic Calendar) if you would like to appeal your final grade. I don't do this to be mean or take away your scholarship but to respect the integrity of all of the grades assigned.
9. For all members of our class to learn effectively, this classroom must be a safe learning environment. To ensure safety for all students, the policy in this class is that no one shall be discriminated against or harassed. For more information on St. Francis Xavier University Discrimination & Harassment Policy, please contact to Marie Brunelle, the Human Rights and Equity Advisor (mbrunell@stfx.ca) or go on line <http://www.mystfx.ca/campus/stu%2Dserv/equity/>
10. I refer your attention to Section 3.7 of the Academic Calendar which deals with classroom attendance.

6 Topics

Roughly this follows Chapters 1-9, selected topics from Chapters 11-15, 23, and 25.

1. History and Scope of Optics
2. Geometrical Optics
 - (a) Refraction and Reflection
 - (b) Fermat's Principle
 - (c) Imaging
 - (d) Thin Lenses
3. Optical Instrumentation
 - (a) Stops and Pupils
 - (b) Aberrations
 - (c) Cameras, Microscopes, Telescopes
4. Wave Perspective of Light and Maxwell's Equations
5. Lasers
6. Interference and Interferometers
7. Coherence
8. Fraunhofer and Fresnel Diffraction
9. Polarized Light