Course Syllabus

UNIVERSITY OF CALGARY
DEPARTMENT OF PHYSICS and ASTRONOMY
COURSE OUTLINE

1. **Physics 375, Introduction to Optics and Waves**

Lecture Time:	L01: TuTh, 12:30-1:45, ST 142	
Instructor:	Paul Barclay	Office: SB135, 403 220-8517,
		Email: pbarclay@ucalgary.ca,
		Office Hours: M 3:00-4:00pm, or by appointment.

   Webpage: http://iqis.org/nanophotonics/phys375.html

2. **PREREQUISITES:** Physics 255 and Applied Mathematics 219.

3. **GRADING:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments	15%	
Laboratory experiments	20%	
Midterm tests (2)	25%	(In class, Oct. 8 and Nov. 12, subject to change)
Final Examination	40%	(To be scheduled by the Registrar)

   A passing grade on the final is required to pass the course.

   A weighted course percentage will be calculated for each student after the final exam is written. Conversion from final course percentage to final course letter grade is as follows:

A+	92 – 100%
A	85 – 91%
A-	80 – 84%
B+	76 – 79%
B	72 – 75%
B-	68 – 71%
C+	64 – 67%
C	60 – 63%
C-	55 – 59%
D	50 – 54%
F	< 50%

4. **MISSED COMPONENTS OF TERM WORK:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in section 3.6: **http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html**. It is the student's responsibility to familiarize himself/herself with these regulations. See also **http://www.ucalgary.ca/pubs/calendar/current/e-3.html**.

5. **TEXTBOOK:** Introduction to Optics (3rd Edition), Pedrotti (Addison-Wesley). Information regarding other recommended texts and/or resources will be distributed in class or online.

6. **EXAMINATION POLICY:** Final and midterm exams will be closed book. Students may use a one page formula sheet and calculator as aids. Students are encouraged to read the Calendar, Section G, on Examinations: **http://www.ucalgary.ca/pubs/calendar/current/g.html**.

7. In this course, the quality of the student's writing in laboratory reports will factor into the evaluation of those reports. See **also** **http://www.ucalgary.ca/pubs/calendar/current/e-2.html**.

8. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

(a) ACADEMIC MISCONDUCT (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under K. Student Misconduct (**http://www.ucalgary.ca/pubs/calendar/current/k.html**) to inform yourself of definitions, processes and penalties

(b) ASSEMBLY POINTS in case of emergency during class time. Be sure to FAMILIARIZE YOURSELF with the information at http://www.ucalgary.ca/emergencyplan/assemblypoints.

(c) ACADEMIC ACCOMMODATION POLICY. Students with documentable disabilities are referred to the following links:
Calendar entry on students with disabilities: **http://www.ucalgary.ca/pubs/calendar/current/b-1.html**
Disability Resource Centre: **http://www.ucalgary.ca/drc/**

(d) SAFEWALK: Campus Security will escort individuals day or night (**http://www.ucalgary.ca/security/safewalk/**). Call **220-5333** for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

(e) FREEDOM OF INFORMATION AND PRIVACY: This course will be conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, **students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page.** For more information see also **http://www.ucalgary.ca/secretariat/privacy.**

(f) STUDENT UNION INFORMATION: VP Academic **Phone**: 220-3911 **Email**: suvpaca@ucagary.ca.
SU Faculty Rep. **Phone**: 220-3913 **Email**: sciencerep@su.ucalgary.ca Website **http://www.su.ucalgary.ca/home/contact.html**.
Student Ombudsman: **http://www.su.ucalgary.ca/services/student-services/student-rights.html**

(i) INTERNET and ELECTRONIC COMMUNICATION DEVICE Information. You can assume that in all classes that you attend, **your cell phone should be turned off**. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

9. OTHER COURSE INFORMATION:

(a) Assignments: There will be one problem set assigned per week, with some exceptions (8-10 assignments). Problem sets will usually be assigned on Thursday and due the following Thursday in class, or at a date/time/location specified on the assignment. Late homework will be penalized 20% per calendar day.

(b) Labs: The laboratory website can be found at http://www.pjl.ucalgary.ca/. General information regarding the labs can be found on this site. Further information will be provided by the laboratory instructor.

(c) Other recommended texts: In addition to the required texts, students are encouraged to seek out other reference material. Two texts which may be useful are *Fundamentals of Photonics* by Saleh and Teich (for more advanced students, and students interested in modern optical technology), and *Modern Classical Optics* by Brooker (as a general reference). Senior students interested in the quantum aspects of light are encouraged to consult *Quantum Optics: An Introduction* by Fox.

Schedule of Topics

Introduction to optics
        Waves and particles
        Sources of light

Geometrical optics
        Reflection and refraction
        Thin lens
        Imaging basic, including photography
        Aberrations

Waves
        Wave equation
        Properties of wave propagation
        Radiation
        Reflection and refraction
        Interference
        Thin films transfer matrix

Fourier Optics
        Fourier transforms
        Diffraction
        Double slit
        Gratings
        Optical Fourier transforms
        Scattering
        Fourier imaging and resolution

Photonic devices (if time permits)
        Fiber optics basics
        Optical systems for communication
        Integrated waveguides
        Lasers