Green Sheet PHYS158 (code 24515)
Spring 2009, Department of Physics, San Jose State University

Time	Monday	Tuesday	Wednesday	Thursday	Friday
09:00-10:30	**Office SCI 264**		**Office SCI 264**		
11:30-12:45	**PHYS 158 SCI 242**		**PHYS 158 SCI 242**		
For some homework problems you need computers. Use the machines in SCI 242 whenever there is no class scheduled in the room. Get your access code from me on the first day of the class.					

Lecturer: Dr. Nayer Eradat Office: Science 264 Phone: TBA
Email: nayer.eradat@erbion.com Website: www.erbion.com Click on Teaching

Contact: The best way to contact me is email or coming to the office hours

Course Description:

This is an upper division course in optics for Physics majors and other students that have the prerequisites. The course is composed of two parts. Part I: geometrical optics include (but not limited to) thin and thick lens systems, matrix methods, aberration theory, optical instrumentation. Part II include: electromagnetic waves and their superposition, Interference of light and interferometry, holography, polarization and matrix methods, Fraunhofer diffraction, diffraction grating. For both parts a brief introduction to using commercial software for optical design and some relevant homework problems will be included. Download a free limited edition of the OSLO from Lambda Research's website for these exercises**.

Prerequisites: PHYS 72 or PHYS 52; MATH 32

Learning Objectives:

Will be discussed on Jan 21st first day of the class

Text: Txt: Introduction to Optics 3rd edition by F.L. Pedrotti, S.J. Pedrotti, L.M. Pedrotti

References: Ref1: Optics by Eugene Hecht

Ref2: Theory and problems of optics; Schaum's outline series by Eugene Hecht

Ref3: Principles of Optics: Electromagnetic Theory of Propagation, Interference and Diffraction of Light by Max Born and Emil Wolf

Lecture: The lectures will meet on Mondays and Wednesdays during the semester. The lectures are designed to discuss the course material, to work examples, and to answer the questions you may have. There will be occasional demonstrations during some lectures that are designed to help you with better understanding of the physical concepts or to make you curious. The lectures are interactive. Problem solving is a big part of the course and it is imbedded in the lectures. Students are expected to get involved in discussions during the class. So it is crucial to read the suggested material before each lecture for active participation in the class and learning the material.

Quizzes: Will be discussed in the class

Exams: There will be 3 midterms and a final exam. Exams will be closed book from the material covered in the class. You are allowed to bring two sheets with your favorite equations in them.

Homework: Homework problem sets and projects will be assigned and collected according to the course calendar on the course website (subject to change as the course progresses).

Grading: Your grade will be determined by your performance on the homework, projects, and exams. Plus and minus grading will be used. The letter grades will be roughly assigned based on the following list A: 90s, B: 80s, C: 70s, D: 60s, F: 50s and below.

Grading Summary

Category	Contribution	Number Dropped
3 Midterms	3x20%=60%	0
Final Exam Wave Optics	20%	0
Home Work	20%	2

Accessing Some of the homework problems may require computer use. If you do not have a computer with web access readily available to you, there are a number of options on campus, including computers in the department and library. If you want to use MATLAB, ask for access code*.

Disabilities: Campus policy in compliance with the Americans with Disabilities Act: "If you need course adaptation or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible or see me during the office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability".

Academic Integrity Statement:

From the Office of Student Conduct and Ethical Development: "Your own commitment to learning, as evidenced by your enrolment at San Jose State University, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The policy on academic integrity can be found at http://sa.sjsu.edu/student _conduct.

Important Dates for spring 2009 Semester:

SPRING 2009

Monday..... January 19.....Dr. Martin Luther King, Jr. Day - Campus Closed
Wednesday..... January 21.....Spring Semester Begins
Wednesday..... January 21.....Pre-Instruction Activities: Orientation, Advisement, Faculty Meetings and Conferences
Thursday..... January 22.....First Day of Instruction
Tuesday..... February 3 ..... Last Day to Drop Courses without an Entry on Student's Permanent Record
Tuesday..... February 10 ..... Last Day to Add Courses & Register Late
Wednesday..... February 18 ..... Enrollment Census Date
Monday – Friday..... March 23-27 ..... Spring Recess
Tuesday..... March 31 ..... Cesar Chavez Day - Campus Closed
Wednesday..... May 13..... Last Day of Instruction
Thursday..... May 14..... Study/Conference Day (no classes or exams)
Friday..... May 15, ... Final Examinations
Monday – Thursday..... May18-21 .... Final Examinations
Friday..... May 22..... Final Examinations Make-Up Day
Saturday ..... May 23.....Commencement
Monday..... May 25 ..... Memorial Day - Campus Closed
Tuesday..... May 26..... Grade Evaluation Day
Wednesday..... May 27..... .....Grades Due From Faculty - End of Academic Year

Date	Day	Quiz	Reading	HW Assigned	HW Due
Week 1					
Jan 26	M		L1: 1.1-4 nature of light, radiometry	H1 Ch1: 7,8,11,16,17, Ch2:4,5,6,7,8	
Jan 28	W		L2: 2.1-7 Huygens'& Fermat's principle, reflection, refraction, imaging		
Week 2					
Feb 2	M		L2: 2.8-12 refraction at spherical surfaces, thin lenses	H2 Ch2:9,11,14,15,17,19,33,	H1
Feb 4	W		L3 : 18.1-5 thick lens, matrix method, translation, reflection, refraction		
Week 3					
Feb 9	M		L4: 18.6-11 all lens matrices, system ray-transfer matrix and their significance, cardinal points, ray tracing	H3 Ch18: 2,5,610,16,17,20,22,	H2
Feb 11	W		L5: 20.1-2 ray and wave aberrations, third order treatment of refraction, spherical aberration		
Week 4					
Feb 16	M		L6: 20.4-7 coma, astigmatism, distortion, chromatic	H4 Ch20:3,7,8,10,11,15,19,21	H3
Feb 18	W		L7: 3.1-3 stops, pupils, windows, prisms		
Week 5					
Feb 23	M		L8: 3.4-5 camera, magnifiers and eyepieces	H5 Ch3: 1,4,7,12,18,19,22,23	H4
Feb 25	W		L9: 3.6-7 microscopes and telescopes		
Week 6					
Mar 2	W		L10: Review and problem solving		H5
Mar 4	W		**Midterm 1 Geometrical Optics**	**Regular class time 11:30-12:45**	
Week 7					
Mar 9	M		L11: Ch4 Wave equations	H6 Ch4: 3,5,7,12,18	
Mar 11	W		L12: from lecture notes EM waves &Maxwell Equations		
Week 8					
Mar 16	M		L13: from notes: interaction of EM waves with material	H7 Ch5: 3,7,8,11,16,17	
Mar 18	W		L 14: Ch 5: Superposition of waves		H6
Week 9 **Spring Recess No Class**					
Week 10					
Mar 30	M		L15: 6.1-4 Energy quantization, Blackbody, Einstein's theory of laser operation	H8 Ch6: 2,6,12,11,15,16,18,20	H7
Apr 1	W		L16: 6.5-8 laser structure, operation, and types		
Week 12					
Apr 6	M		L17: 7.1-3 Two beam interference, Young's double slit experiment, virtual sources	H9 Ch7: 2,4,7,9,15,19,20,25	H8
Apr 8	W		L18: 7.4-9 Interference in dielectric films, Newton's rings, film thickness measurements, Stokes relations Multiple beam interference		
Week 13					
Apr 13	M		L19 :8.1-5 Michelson interferometer and its applications Fabry-Perot interferometer, Airy function	H10 Ch8: 1,5,9,10,11,18	H9
Apr 15	W		L20: 8.6-8 Applications of Fabry-Perot interferometer		
Week 14					
Apr 20	M		L21 10.1- Fiber Optics (not included in the exam)	No HW	H10
Apr 22	W		**Midterm 2 Content of Ch 4,5,6,7,8**	**Regular class time 11:30-12:45**	
Week 15					
Apr 27	M		L22: 11.1-4 Diffraction from a single slit, rectangular and circular apertures, resolution	H11 Ch 11:1,3,9,16,11,22	
Apr29	W		L23: 11.5-6 Diffraction from double slit, many slits		
Week 16					
May 4	M		L24:12 1-4 Grating equation, free spectral range, dispersion, resolution, types, blazing, applications	H12 Ch 12: 1,2,4,6, Ch 14: 2, 3, 9,13	H11
May 6	W		L25: Ch14 Mathematical representation of polarized light and polarizers, Jones matrices		
Week 17					
May 11	M		L26: Ch15.6-7 optical activity, photoelasticity, Review		H12
May 13	W		**Midterm 3 contents of Ch 11,12,14,15**	Final exam hand out day, have to be present to receive, or get it by appointment	
May 19	**TU**		**Final from all of the covered material (take home)**	**9 :45-12 :00**	

*A tutorial to get started can be found at: http://www.mathworks.com/academia/student_center/tutorials/launchpad.html

** http://www.lambdares.com/education/oslo_edu/