

## Tentative Course Schedule

Week	Date	Day	Topic	Relevant Reading	HW/Report Due	Laboratory
1	09/01/11	Thu	Introduction Nature of Light	Syllabus Ch. 1-1 to Ch. 1-2		<i>No Labs</i>
2	09/06/11	Tue	Nature of Light	Ch. 1-3 to Ch. 1-4	1. Beginning-of-Class Survey, 2. Pledge 2. HW#1a	<i>L0: Introduction &amp; Wave-Particle Duality of Light (demo)</i>
	09/08/11	Thu	Geometrical Optics: Reflection and Refraction (Snell's law, Spherical mirrors/surfaces)	Ch. 2-1 to Ch. 2-5	HW#1b	
3	09/13/11	Tue	Geometrical Optics: Thin lens imaging	Ch. 2-9 to Ch. 2-11		<i>L1: Thin Lens</i>
	09/15/11	Thu	Optical Instrumentation: Stops/Pupils, Prisms, and Camera.	Ch. 3-1 to Ch. 3-4	HW#2	
4	09/20/11	Tue	Optical Instrumentation: Microscope, Telescope	Ch. 3-5 to Ch. 3-7	<i>Lab #1</i>	<i>L2: Telescope and Microscope</i>
	09/22/11	Thu	Aberration	Chapter 20	HW#3	
5	09/27/11	Tue	Wave Equations	Ch. 4-1 to Ch. 4-7	<i>Lab #2</i>	<i>L3: Aberration</i>
	09/29/11	Thu	EM Waves, Polarization Fresnel Equations	Ch. 4-8 to Ch. 4-10 Ch. 23-1, 23-2, & 23-4	HW#4	
6	10/04/11	Tue	Representation of Polarized Light Production of Polarized Light	Chapter 14 Ch. 15-1 to Ch. 15-4 Instructions for Group Projects	<i>Lab #3</i>	<i>L4: Polarized Light</i>
	10/06/11	Thu	Midterm Review/Exercises	Chapters 1, 2, 3, 4, 14, & 15.	HW#5 Project Choices	
7	10/11/11	Tue	Midterm Exam			<i>No Labs</i>
	10/13/11	Thu	Superposition of Waves Interference of Light	Ch. 5-1 to Ch. 5-4 Ch. 7-1 to Ch. 7-3	HW#6 = MT Corrections	

Week	Date	Day	Topic	Relevant Reading	HW/Report Due	Laboratory
8	10/18/11	Tue	Interference of Light	Ch. 7-4 to Ch. 7-7	Lab #4	L5: Interference fringes & Newton's rings
	10/20/11	Thu	Optical Interferometry	Ch. 8-1, 8-2, 8-3, & 8-10 (skip Ch. 8-4 to 8-9)	HW#7	
9	10/25/11	Tue	Coherence	Chapter 9 Ch. 5-5 (The beat phenomena) Instructions for Advanced Labs	Lab #5	L6: Michelson interferometer
	10/27/11	Thu	Fraunhofer Diffraction Fresnel Diffraction	Chapter 11 Ch. 13-1 & 13-2	HW#8 Adv. Lab Choices	
10	11/01/11	Tue	The Diffraction Grating	Chapter 12	Lab #6	L7: Diffraction slits and gratings
	11/03/11	Thu	Holography	Chapter 16	HW#9	
11	11/08/11	Tue	Optics of the Eye	Ch. 19-1 to Ch. 19-3	Lab #7	L8: Holograms
	11/10/11	Thu	Optics of the Eye	Ch. 19-4 to Ch. 19-6	HW#10	
12	11/15/11	Tue	Group Project Presentations		Lab #8	L9: A – Optical Trapping B – Plank constant C – Fourier Optics D – Quantum Optics  Lab #9 is due by 5 pm, 12/09/11 (submit a hard copy to 4238 BPS and email an electronic to <a href="mailto:cwlai@msu.edu">cwlai@msu.edu</a> )
	11/17/11	Thu	Group Project Presentations			
13	11/22/11	Tue	Review and Exercises			
	11/24/11	Thu	Thanksgiving	Holiday		
14	11/29/11	Tue	Fourier Optics	Chapter 21	HW#11	
	12/01/11	Thu	Properties of Lasers	Chapter 6 (skip 6-5, 6-6, and 6-8)		
15	12/06/11	Tue	Basic Fiber Optics Characteristics of Laser Beams	Ch. 10-4, 10-5, & 10-6 Ch. 27-1 & 27-4	HW#12	
	12/08/11	Thu	Optical Properties of Materials	Ch. 5-6 (phase and group velocities) Ch. 25-1 & 25-2		
16	12/12-12/14?		Final Exam			

<b>Text/Lectures</b>	<b>Relevant Labs</b>	<b>Homework</b>
Chapter 01 <i>Nature of Light</i>	L0-demo: Wave-Particle Dualities of light, L10-B: Photoelectric Effects	HW#1: Nature of light
Chapter 02 <i>Geometrical Optics</i>	L1: Thin Lens	HW#2 & HW#3
Chapter 03 <i>Optical Instrumentation</i>	L2: Telescope, and Microscope	HW#4
Chapter 04 <i>Wave Equations</i>	L4: Polarization	HW#5
Chapter 05 <i>Superposition of Waves</i>	L5: Interference Fringes and Newton's Rings	HW#7
Chapter 06 <i>Properties of Lasers</i>	L10-A: Optical Trapping, L10-B: Photoelectric Effects	HW#12
Chapter 07 <i>Interference of Light</i>	L5: Interference Fringes and Newton's Rings	HW#7
Chapter 08 <i>Optical Interferometry</i>	L6: Michelson Interferometer	HW#8
Chapter 09 <i>Coherence</i>	L6: Michelson Interferometer	HW#8
Chapter 10 <i>Fiber Optics</i>	L10-C: Fourier Optics	HW#12
Chapter 11 <i>Fraunhofer Diffraction</i>	L7: Diffraction slits and gratings	HW#9-10
Chapter 12 <i>The Diffraction Grating</i>	L7: Diffraction slits and gratings	HW#9-10
Chapter 13 <i>Fresnel Diffraction</i>	L7: Diffraction slits and gratings	HW#9-10
Chapter 15 <i>Production of Polarized Light</i>	L4: Polarization	HW#5
Chapter 16 <i>Holography</i>	L9: Holograms	HW#10
Chapter 19 <i>Optics of the Eye</i>		HW#11
Chapter 20 <i>Aberration Theory</i>	L3: Lens Aberrations	HW#4
Chapter 21 <i>Fourier Optics</i>	L10-B: Fourier Optics, Spatial Filtering	HW#12
Chapter 23 <i>Fresnel Equations</i>	L4: Polarization	HW#5
Chapter 25 <i>Optical Properties of Materials</i>		
Chapter 27 <i>Characteristics of Laser Beams</i>	L10-A: Optical Trapping, L10-C: Fourier Optics	HW#12
<b>Not covered in lectures</b>		
Chapter 14 <i>Matrix Treatment of Polarization</i>		
Chapter 18 <i>Matrix Methods in Paraxial Optics</i>		
Chapter 22 <i>Theory of Multilayer Films</i>		
Chapter 24 <i>Nonlinear Optics and the Modulation of Light</i>		
Chapter 26 <i>Laser Operation</i>		
Chapter 17 <i>Optical Detectors and Displays</i>	L10-B: Photoelectric Effects	
Chapter 28 <i>Selected Modern Applications</i>	L10-A: Optical Trapping, L10-D: Quantum Optics,	