

2.710 Optics

FALL 2005 SYLLABUS

(Key: H=Hecht, G=Goodman)

Date	Lecture/Assignments/Notes	Reading
We 9/7	Introduction; photons, EM spectrum Reflection & refraction	H1, H3.3.3,3.6 H4.3-5,5.4.1
	HW1 posted	
Mo 9/12	Total internal reflection, waveguiding Prisms, paraboloidal reflectors	H4.7,5.6 H5.5,4.5.4.2
We 9/14	Introduction to lenses	H5.2,6.2
	HW1 due; HW2 posted	
Mo 9/19	<i>Student holiday – no classes</i>	
We 9/21	Reflective optics Geometrical optics – Lenses	H5.4.3 H6.1
	HW2 due; HW3 posted	
Mo 9/26	The human eye	H5.7.1-2
We 9/28	Apertures and stops	H5.3
	HW3 due; HW4 posted	
Mo 10/3	Optical systems	H5.7.3-7
We 10/5	Aberrations, optical design Geometrical Optics overview	H6.3-5
	HW4 due; practice problems posted	
Mo 10/10	<i>Columbus holiday – no classes</i>	
We 10/12	QUIZ 1 (1 st hour)	
	Electromagnetic waves (2 nd hour)	H2.1-6,3.1-2
Mo 10/17	Properties of electromagnetic waves	H2.7-9,3.3
We 10/19	Polarization Two-beam interference Fabry–Perot interferometer	H8.1-3 H9.1,9.3-4 H9.6
	HW5 posted	
Mo 10/24	Lasers; coherence	H13.1.3,9.2
We 10/26	Spatial Fourier transforms	H11.2, G2.1
	HW5 due; HW6 posted	

Date	Lecture/Assignments/Notes	Reading
Mo 10/31	The spatial frequency domain	G2.3
We 11/2	Fresnel & Fraunhofer diffraction	G4.2-4
	HW6 due; HW7 posted	
	PROJECT ASSIGNMENTS	
Mo 11/7	Wave description of lenses	G5.1
	Fourier-transforming property of lenses	G5.2
We 11/9	Coherent imaging using lenses	G5.3,6.2
	HW7 due; HW8 posted	
Mo 11/14	Incoherent imaging	G6.1-3
We 11/16	Review of coherent/incoherent imaging and spatial filtering	
	HW8 due; practice problems posted	
Mo 11/21	QUIZ 2	
We 11/23	Resolution of imaging systems Aberration effects on resolution	G6.4
	HW9 posted	
Mo 11/28	Comparison of coherent/incoherent imaging Resolution beyond the diffraction limit	G6.5 G6.6
We 11/30	Wavefront modulation	G7.1-3
	HW9 due; HW10 posted	
	PROJECT PRESENTATIONS	
Mo 12/5	Introduction to holography	G9.1-6
We 12/7	Volume holography, applications	G9.7,9.12
	HW10 due; practice problems posted	
Mo 12/12	Image restoration	G8.8
We 12/14	Modern optics: 3D imaging, nano-photonics General review	