

PHYS4210 Electromagnetic Theory (Spring 2009)

April 20, 2009

Day	Date	Topics	Reading	Homework Due	
Mon	12 Jan	Math review: Vectors and vector calculus; Transformations and tensors	Chapter One	_____	
Thu	15 Jan	Coulomb's law and Gauss' law; Electric potential	2.1-2.4	1-3, 1-5(a)	
Mon	19 Jan	No Classes: Martin Luther King Day			
Thu	22 Jan	Potential and conductors; Dipole moment and displacement field	2.5-2.6	1-7, 1-9, Post	
Mon	26 Jan	Energy of a charge distribution; Cylindrical and spherical coordinates	2.7, 2.9	_____	
Thu	29 Jan	Solving Laplace's equation in cartesian and cylindrical coordinates	2.10-2.11	2-1, 2-3, Post	
Mon	2 Feb	Boundary value problems in spherical coordinates	2.12-2.13	_____	
Thu	5 Feb	Multipole expansion of a charge distribution; The electrostatic stress tensor	2.14-2.16	2-8, Post	
Mon	9 Feb	Relativity and Lorentz transformations; Four-vectors	3.1-3.3; <i>Notes</i>	2-16	
Thu	12 Feb	Midterm Exam #1 (Through Chapter Two)			
<i>Tue</i>	17 Feb	Magnetism from electricity and relativity; Maxwell's equations	3.4-3.6	_____	
Thu	19 Feb	Magnetostatics and the laws of Biot-Savart and Ampere	4.1-4.5	3-2, 3-7, 3-10	
Mon	23 Feb	Magnetization; Magnetic dipoles	4.6-4.7	_____	
Thu	26 Feb	Motion in a magnetic field; The magnetic stress tensor	4.8-4.12	4-1, 4-3	
Mon	2 Mar	Time dependence; Energy and momentum conservation	5.1-5.3	_____	
Thu	5 Mar	Electromagnetic waves, displacement currents, and retarded potentials	5.4-5.6	4-2, 4-7, 5-1	
9-13 Mar Spring Break					
Mon	16 Mar	Example: Electric dipole radiation	<i>Notes</i> ; 8.2	_____	
Thu	19 Mar	Radiation of a moving charge; Scattering from bound electrons	6.1-6.3; 6-9	5-8, Post	
Mon	23 Mar	Absorption and reflection of radiation by a conducting sheet	7.1-7.2	Post	
Thu	26 Mar	Midterm Exam #2 (Through Chapter Six)			
Mon	30 Mar	The refractive index; Phase and group velocity	7.3-7.5	_____	
Thu	2 Apr	Reflection, refraction, and Fresnel's equations	7.6-7.7	7-2	
Mon	6 Apr	The multipole expansion; Dipole and quadrupole radiation	8.1-8.3	7-3	
Thu	9 Apr	Applications to optics; Diffraction	8.4-8.6	Post	
Mon	13 Apr	Rectangular waveguides	9.1	_____	
Thu	16 Apr	Ideal and lossy rectangular cavities	9.2-9.3	8-5, 9-1	
Mon	20 Apr	Potentials and energy in transverse gauge	<i>Notes</i>	9-4	
Thu	23 Apr	Midterm Exam #3 (Through Chapter Nine)			
Mon	27 Apr	Next steps: Electromagnetism and quantum mechanics		Post	