Spring 2024 – PHYSICS 3034 – R.Sonnenfeld

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SCHEDULE – (Rev. B– 01/19/2024)

Wk	Date	Class Topic	Reading Asst.	HW Asst.
1	1/17	[1] Overview, Maxwell in Integral and Diff Form		
	1/19/24	[2] B-field energy, Continuity Eqn → Maxwell Disp. Current		
2	1/22	[3] Energy Continuity & Poynting's Theorem	[R1] 7.3.1–7.3.3	
	1/24	[4] Derive Poynting Th'm, Examples		HW01
	1/26	[5] Mech Waves → Wave Eqn, k ω, Waves in 1D	[R2] Ch. 8.1.1–8.1.2	
3	1/29	[7] $\vec{k}$, Complex arithmetic for waves	[R4] Ch. 9.1.1–9.1.2	
	1/31	[8] Q&A, 1-D Reflection & Transmission	[R5] Ch. 9.1.3–9.1.4	HW02
	2/02	[9] 1-D R&T, 3-D Plane Waves	[R6] 9.2.1–9.2.2	
4	2/05	[10] Energy and Momentum of EM Plane Waves	[R7] 9.2.3	
	2/07	[11] Poynting vector and intensity of plane waves		
	2/09	[12] EM waves boundary conditions	[R8] 9.3.1	
5	2/12	[13] Reflection and Refraction	[R9] 9.3.2	
	2/14	[14] Snell's Law		HW03
	2/16	[15] Polarization and Brewster's Angle	[R10] 9.3.3	
6	2/19	[16] Oblique Reflection & Transmission	[R11] 9.4.1, 9.4.2	
	2/21	[17] Derive Wave Eqn in Conductors	[R12] 9.4.3	
	2/23	Test 1 (in-class)		
7	2/26	[18] Q&A		
	2/28	[19] Waves in Conductors, B lags E		HW04
	3/01	[20] R & T for Conductors		
8	3/04	[21] Dispersion, Electrons on Springs [R13] 9.5.1		
	3/06	[22] Jellium, Derive Cauchy Relation	[R14] 9.5.2	
	3/08	[23] Exam Review		
9	3/11	[24] Dispersion, Group & Phase vel.		
	3/13	[25] That's all for waves. Let's start radiation.		
	3/15	[26] Slack		
*	3/18–22	Spring Break		
10	3/25	[27] Retarded potentials, worked example	[R15] 10.1.1, 10.1.2	
	3/27	[28] Numerical solutions, Intro to Gauges	[R16] 10.1.3	
	3/29	NO CLASS	Good Friday	

Wk	Date	Class Topic	Reading Asst.	HW Asst.
11	4/01	[29] Coulomb and Lorenz Gauge	[R17] 10.2.1	
	4/03	[30] Lorenz, Potential of moving point charge		HW05
	4/05	[31] Potentials of moving point charge		
12	4/08	ECLIPSE – NO CLASS	[R18] 10.3.1	
	4/10	[32] Jefimenko Eqns / near and far field		
	4/12	[33] Electric dipole radiation	[R19] 10.3.2	HW06
13	4/15	[34] Electric dipole Radiation	[R20] Ch. 11.1.1	
	4/17	[35] Larmor Power Formula	[R21] 11.1.2 (partial)	
	4/19	[36] Q&A		
14	4/22	[37] Accelerated point charge	[R22] 11.1.3	HW07
	4/24	[38] Relativity	[R23] 11.1.4	
	4/26	[39] Relativity	[R24] 11.2.1	
15	4/29	[40] Relativity		HW08
	5/01	[41] Finals		