ECE110H1S – Electrical Fundamentals – 2015

The lecture outline below is only approximate. The actual topics and lecture schedule may vary.

#	Week	Topics	Sections	Sections	Important Dates
1	Jan.5	Course introduction, Review of vectors			
2		Electric charges, Conductors and insulators Coulomb's law,	Halliday (9 ed.) **21**-1, 2, 3, 4, 5, 6	Halliday (10 ed.) **21**-1	
3		Electric field and field lines, Electric field of a point charge, Force on a point charge	**22**-1, 2, 3, 4, 8	**22**-1, 2, 6	
4	Jan.12	Electric flux. Gauss' law	**23**-1, 2, 3, 4, 5	**23**-1, 2	
5		More on Gauss' law	**23**-6, 7, 8	**23**-3, 4, 5, 6	
6		Electric potential energy, Electric potential	**24**-1, 2, 3, 4	**24**-1	
7	Jan.19	More on electric potential	**24**-5, 6, 7, 11	**24**-2, 3, 7	
8		Capacitance, Capacitor	**25**-1, 2, 3	**25**-1, 2	Assignment 1 due (Jan.24)
9		Capacitors with dielectric, in parallel/series, Energy stored in capacitors	**25**-4,5,6	**25**-3, 4, 5	
10	Jan.26	Current, Current density, Voltage, Resistance, Ohm's law, Power in resistors	**26**-2, 3, 4, 5, 7	**26**-1, 2, 3, 4, 5	
11		Review on electricity (catch-up lecture)			
12		Magnetic field and field lines, Force on a moving charge, Force on a current-carrying wire	**28**-2, 3, 8	**28**-1, 6	Assignment 2 due (Jan.31)
13	Feb.2	Magnetic field due to a current, Biot-Savart Law, Force between two parallel currents	**29**-1, 2, 3	**29**-1, 2	
14		Ampere's law, Solenoids	**29**-4, 5(solenoids)	**29**-3, 4(solenoids)	
15		Faraday's law, Lenz's law, Induction	**30**-2, 3, 4	**30**-1	Test 1 (Feb. 5)
16	Feb.9	Induction and energy transfer	**30**-5	**30**-2	Covers ch 21-28
17		Inductance, Inductors in parallel/series, Energy stored in inductors	**30**-7, 8, 10	**30**-4, 5, 7	
18		Review on magnetism (catch-up lecture)			
	Feb. 16	***READING WEEK***			Assignment 3 due (Feb.21)
19	Feb.23	Basic circuit elements, Kirchhoff's laws	Irwin (10 ed.) **1**.1, 2, 3, **2**.1, 2	Irwin (10 ed.) **1**.1, 2, 3, **2**.1, 2	
20		Resistors in series/parallel, Current and voltage division rules	**2**.3, 4, 5, 6	**2**.3, 4, 5, 6	
21		Nodal analysis	**3**.1	**3**.1	
22	Mar.2	Mesh (loop) analysis	**3**.2	**3**.2	
23		Nodal / loop analyses (dependent sources)	**3**.1, 2	**3**.1, 2	
24		Linearity, Superposition	**5**.2	**5**.2	
25	Mar.9	More on superposition	**5**.2	**5**.2	
26		Thevenin's and Norton's theorems	**5**.3	**5**.3	Assignment 4 due (Mar.14)
27		Thevenin's / Norton's (dependent sources)	**5**.3	**5**.3	
28	Mar.16	Maximum power transfer	**5**.4	**5**.4	
29		Review on DC circuits (catch-up lecture)			Test 2 (Mar.19) Covers
30		Review of capacitors and inductors, First-order RC and RL circuits	**6**.1, 2, 3 **7**.2	**6**.1, 2, 3 **7**.2	ch 29-30 & Irwin ch 1-3 Assignment 5 due (Mar.21)
31	Mar.23	First-order circuits (step-by-step technique)	**7**.2	**7**.2	
32		More on first-order circuits	**7**.2	**7**.2	
33		Sinusoids	**8**.1	**8**.1	Assignment 6 due (Mar.28)
34	Mar.30	Review of complex numbers	Appendix	Appendix	
35		Phasors	**8**.2, 3	**8**.2, 3	
36		Impedances	**8**.4, 5, 6	**8**.4, 5, 6	
37	Apr.6	AC steady-state analysis	**8**.7, 8	**8**.7, 8	
38		More on AC circuits	**8**.7, 8	**8**.7, 8	Assignment 7 due (Apr.10)
39		Course review			