

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			Assignment 1 due (Jan.24)
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	
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	Assignment 2 due (Jan.31)
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	
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)	Test 1 (Feb. 5) Covers ch 21-28
15		Faraday's law, Lenz's law, Induction	30-2, 3, 4	30-1	
16	Feb.9	Induction and energy transfer	30-5	30-2	
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)			Assignment 3 due (Feb.21)
	Feb. 16	READING WEEK			
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	
27		Thevenin's / Norton's (dependent sources)	5.3	5.3	Assignment 4 due (Mar.14)
28	Mar.16	Maximum power transfer	5.4	5.4	
29		Review on DC circuits (catch-up lecture)			
30		Review of capacitors and inductors, First-order RC and RL circuits	6.1, 2, 3 7.2	6.1, 2, 3 7.2	
31	Mar.23	First-order circuits (step-by-step technique)	7.2	7.2	Test 2 (Mar.19) Covers ch 29-30 & Irwin ch 1-3 Assignment 5 due (Mar.21)
32		More on first-order circuits	7.2	7.2	
33		Sinusoids	8.1	8.1	
34	Mar.30	Review of complex numbers	Appendix	Appendix	
35		Phasors	8.2, 3	8.2, 3	Assignment 6 due (Mar.28)
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	
39		Course review			Assignment 7 due (Apr.10)