

### Topical Outline

Part	Lecture	Reading	Description	Hwk	Labs
1. Linear Resistive Circuits	1	2-1, 2-2	Element constraints, connection constraints	:	No Labs
		2-3	Combined constraints, KCL and KVL		
		3-1	Nodal analysis		
	2	3-1	Nodal analysis by inspection		
		3-2	Mesh analysis, solving by inspection		
	3	3-3	Linearity and superposition		
		2-4, 2-5	The <i>i-v</i> Characteristic, equivalent circuits		
4	3-4, 3-5	Thévenin and Norton equivalent circuits			
	4-1, 4-2	Circuit analysis with controlled sources			
2. Op Amps	5	4-3	Operational amplifier: real and ideal	HW1	Lab 1 - Resistive circuits.
	6	4-4	Operational amplifier - analysis principles	:	
	7	4-4, 4-5	Solving circuits with OP AMPS	:	
3. Linear Dynamic Circuits	8	6-1, 6-2	Capacitors and inductors	:	Lab 2 - OP Amp circuits.
		6-3	Dynamic OP AMP circuits		
		6-4	Series and parallel combinations		
	9	Notes	Review of differential equations		
	10	7-1	Basic RC and RL circuits		
		7-2, 7-3	Step response		
		7-4	Exponential input		
	11	7-5	Series RLC circuit		
		7-7	Step response		
	12	7-6	Parallel RLC circuit		
Notes		Exponential and sinusoidal inputs			
4. Sinusoidal Steady State Analysis	13	8-1	Complex numbers, sinusoids and phasors	:	Lab 3 - RC circuit and integrator.
	—	—	<b>Thanksgiving (Monday) - no class.</b>		
	14	8-2	Circuit and element constraints, impedance		
		8-3	Basic circuit analysis with phasors		
	15	8-3, 8-4	Basic phasor analysis, Thévenin/Norton		
		8-5, 8-6	Nodal/Mesh analysis, energy and power		
	16	15-1 – 15-3	Coupled inductors, the dot convention		
	17	15-4	The ideal transformer		
	18	15-5	Transformer circuits phasor domain analysis		
	19	16-1	Power in sinusoidal steady state		
20	16-2, 16-3	Complex power, power in phasor domain			
21	16-4	Power flow, power factor correction			
5. Frequency Domain Analysis	22	9-1 – 9-4	The Laplace transform	HW4	Lab 4 - Second order circuits.
	23	9-5, 10-1	Laplace circuit analysis, transformed circuits	:	
	24	10-2 – 10-5	Circuit analysis in the s-domain	:	
	—	—	<b>Fall Study week - no classes.</b>		
	25	11-1, 11-2	Network function, transfer function	:	
	26	11-3, 11-6	Impulse response, convolution	HW5	
	27	11-4, 11-5	Step response, sinusoidal steady-state response	:	
	28	12-1 – 12-3	Frequency response, first-order low-pass	:	
	29	12-3	First-order low-pass and high-pass responses	:	
	30	12-4	Bandpass and bandstop responses		
31	12-5	The frequency response of RLC circuits			
32	12-6, 12-7	Bode diagrams with poles and zeros			
33	14-1, 14-2	Active filters, second order low/high pass filters	:	Lab 5 - Signal filtering.	
	34	14-3			Second order bandpass and bandstop filters
35	—	Course review		No Labs	