

Spring 2000

**EECS 42**

W. G. Oldham

WEEK	Dates	Lecture	Reading	Topics	Key Ideas
1	Jan 16	1	0.1-0.4	EECS, Signals, Analog and Digital	Hardware: Systems, Circuits, IC's, Passive and Active devices, Signals
1	Jan 18	2	1.1	Electrical Quantities	Energy, Potential, Charge, Field, Voltage, Current, Power, Ground
2	Jan 23	3	2.1, 2.2, 5.1	Ideal Circuit Elements	Ohms law, Resistors, Voltage sources, Current sources, Wires, Series, Parallel
2	Jan 25	4	2.2, 3.2	I-V graphs	I vs V for 2-terminal elements, Linear and Non-linear behavior
3	Jan 30	5	1.2,1.3	Circuits and Circuit Laws	Branches, Nodes, Circuit, KVL, KCL
3	Feb 1	6	3.3	Power, Energy Calculations	Instantaneous and Average Power
4	Feb 6	7	5.1,5.2, Notes	Capacitors, Inductors, Transients	C, L, continuity of V or I, steady state versus transient quantities
4	Feb 8	8	8.1	Step Response	Decaying exponential solutions for first-order circuits, Initial and Steady-state values, Time constants
5	Feb 13	9	2.3 pp53-58	Nodal Analysis	Nodal equations, supernodes,
5	Feb 15	10	2.5, 2.6	DC Circuit applications	Voltage and Current dividers, real and ideal voltmeter, ammeter, ohmmeter
6	Feb 20	11	3.1	DC Equivalent Circuits, Weird circuits	Equivalence, Thévenin and Norton
6	Feb 22	12	Midterm 1 (Thru Lect 10)	Midterm 1 Closed-book exam, Key formulas and equations supplied on exam	Circuits, KCL, KVL violations
7	Feb 27	13	3.2	Load lines, Circuit tricks	Everything in Lectures 1-10
7	Mar 1	14	4.1	Dependent Sources	KVL, KCL for real, Circuit simplifications
8	Mar 6	15	4.2, Notes	Amplifiers	4 dependent source forms, nodal analysis with dependent sources
8	Mar 8	16	11.1, 11.2	Digital Signals, gates	Linear amplifiers, saturation, rails
9	Mar 13	17	11.2	Logic Synthesis	Logic levels, NAND, NOR, EXOR gates
					Sum of Products, Minimization, DeMorgan's Theorem,

9	Mar 15	18	11.3	Flip Flops	S-R, D Flip Flops, Static Memory
10	Mar 20	19	8.1, Notes	Digital Signals as pulses	Pulse response
10	Mar 22	20	3.3, 5.2, Notes	Energy and Power in Capacitor Circuits	$CV^2 f$ power, scaling of power
	Mar 26-30		Spring Break	Spring Break	
11	April 3	21	13.1	Review	Lect 1-20, emphasis on 11-20
11	April 5	22	Midterm 2 (Thru Lect 20)	Midterm 2 Closed-book exam, Key formulas and equations supplied on exam	Everything in Lectures 1-20 (Emphasis lectures 11-20)
12	April 10	23	13.2	Semiconductors	Crystals, doping, n- and p-type Si
12	April 12	24	13.2	Diodes	PN junctions, ideal rectifier, diode models
13	April 17	25	13.4	Simple diode circuits	Rectifiers, peak detectors, diode logic
13	April 19	26	13.4. 15.3,	MOS Transistors	Field effect, Threshold, Controlled resistance, 3-terminal I vs V plots
14	April 24	27	13.5	CMOS Device behavior	NMOS, PMOS, Saturation, $I_{DSAT}$ , $\lambda$ , Short and long-channel behavior
14	April 26	28	15.3	CMOS Fabrication	Patterning, Deposition, Etching
15	May 1	29	15.3, notes	CMOS Static Logic	Transfer Curve, CMOS inverter, NAND, NOR
15	May 3	30	notes	:CMOS Performance – Logic Delays	RC and Constant-current delays, gate and load capacitance, fan-out
16	May 8	31		Review	
			Final		