

# EECS 105: Microelectronic Devices and Circuits

## Fall 2001 Schedule

R. T. Howe

WEEK	LECTURE TOPICS	READING	LAB
<i>Week 1</i>			<i>no lab</i>
	<b>Phasors and the Frequency Domain</b>		
	Lec. 1 (8/27) course overview: sinusoidal sources	Reader: OS excerpt	
	Lec. 2 (8/29) phasor representation; impedance	Reader: OS excerpt	
	Lec. 3 (8/31) transfer functions, time/frequency domain	HS 10.1	
<i>Week 2</i>			<i>no lab</i>
	<i>Labor Day Holiday (9/3)</i>	<i>(read HP 4155 manual sections)</i>	
	Lec. 4 (9/5) Bode plots: first-order transfer functions	HS 10.1	
	Lec. 5 (9/7) Second-order circuits: time domain	Reader: OS excerpt	
<i>Week 3</i>			<i>Exp. 1</i>
	Lec. 6 (9/10) Second-order circuits: frequency domain	Reader: OS excerpt	
	Lec. 7 (9/12) Higher-order transfer functions	HS 10.1	
	<b>IC Two-Terminal Circuit Elements: Resistors and Capacitors</b>		
	Lec. 8 (9/14) donors and acceptors in Si; drift current	HS 2.1-2.3	
<i>Week 4</i>			<i>Exp. 2</i>
	Lec. 9 (9/17) Ohm's law, IC resistors, sheet resistance	HS 2.6	
	Lec. 10 (9/19) metal-metal capacitor	HS 3.1	
	Lec. 11 (9/21) pn junction (equilibrium, reverse bias)	HS 3.4.1-2, 3.5	
<i>Week 5</i>			<i>Exp. 3</i>
	Lec. 12 (9/24) pn junction small-signal capacitor	HS 3.6	
	Lec. 13 (9/26) MOS small-signal capacitor	HS 3.7, 3.9	
	<b>The MOSFET</b>		
	Lec. 14 (9/28) MOSFET large-signal overview	HS 4.1	
<i>Week 6</i>			<i>Exp. 4</i>
	Lec. 15 (10/1) MOSFET large-signal model	HS 4.3	
	Lec. 16 (10/3) MOSFET small-signal model	HS 4.5	
	<b>pn Junction Devices</b>		
	Lec. 17 (10/5) pn junction diode under forward bias	HS 6.1-6.3	

WEEK	LECTURE TOPICS	READING	LAB
<i>Week 7</i>	Lec. 18 (10/8) circuit models, diffusion capacitance	HS 6.4-5	<i>no lab</i>
	<b>Midterm I. Wednesday, October 10, 6-7:30 pm (no lecture 10/10)</b>		
	Lec. 19 (10/12) bipolar transistors in forward-active bias	HS 7.1-2	
<i>Week 8</i>	Lec. 20 (10/15) bipolar transistor small-signal model	HS 7.5	<i>Lab Quiz, Exp. 5</i>
	<b>Integrated Single-Stage Amplifiers</b>		
	Lec. 21 (10/17) Amplifier concept; 2-port parameters	HS 8.1,2	
	Lec. 22 (10/19) Common source amplifier: biasing	HS 8.3	
<i>Week 9</i>	Lec. 23 (10/22) Common source amp: two-port model	HS 8.5	<i>Exp. 6</i>
	Lec. 24 (10/24) Common gate amplifier: biasing	HS 8.8	
	Lec. 25 (10/26) Common gate amp: two-port model	HS 8.8	
<i>Week 10</i>	Lec. 26 (10/29) Common drain amplifier: biasing	HS 8.9	<i>Exp. 7</i>
	Lec. 27 (10/31) Common drain amp: two-port model	HS 8.9	
	Lec. 28 (11/2) Bipolar amplifier stages	HS 8.1,2,9	
<i>Week 11</i>	Lec. 29 (11/5) Summary of single stage amplifiers	HS 8.1-9	<i>Exp. 8</i>
	<b>Frequency Response of Single-Stage Amplifiers</b>		
	Lec. 30 (11/7) Current amplifiers: transition frequency	HS 10.2-3	
	Lec. 31 (11/9) Voltage amplifiers: Miller approximation	HS 10.4	
<i>Week 12</i>	<i>Veteran's Day Holiday (no lecture)</i>		<i>no lab</i>
	<b>Midterm II. Wednesday, November 14, 6-7:30 pm (no lecture 11/14)</b>		
	Lec. 32 (11/16) Voltage and current buffer $f$ response	HS 10.5-6	
	<b>Integrated Multistage Amplifiers</b>		
<i>Week 13</i>	Lec. 33 (11/19) Multistage amplifiers: two-port cascades	HS 9.1-2	<i>Exp. 9</i>
	Lec. 34 (11/21) Direct-coupled amps: DC level shifting	HS 9.3	
	<i>Thanksgiving Holiday (11/22-23)</i>		
<i>Week 14</i>	Lec. 35 (11/26) Integrated current supplies	HS 9.4	<i>Lab Quiz, Exp. 11</i>

WEEK	LECTURE TOPICS	READING	LAB
Lec. 36 (11/28)	Multistage amp example: transconductance	HS 9.5	
Lec. 37 (11/30)	Multistage amp examples: voltage	HS 9.5	
<i>Week 15</i>			<i>Makeup</i>
<b>Multistage Amplifier Frequency Response</b>			
Lec. 38 (12/3)	Open-circuit time constants	HS 10.4.4	
Lec. 39 (12/5)	Multistage amp frequency response	HS 10.7	
Lec. 40 (12/7)	Voltage amplifier example	HS 10.7.2	

***Final Examination: Wednesday, December 12, 8:00 am – 11:00 am.***

HS: R. T. Howe and C. G. Sodini, *Microelectronics: An Integrated Approach*, Prentice Hall, 1997.  
 Reader: EE 105 course reader, available at Copy Central. OS = W. G. Oldham and S. E. Schwarz,  
*Introduction to Electrical Engineering*, 1<sup>st</sup> Edition, HRW, 1984.