EECS 105: Microelectronic Devices and Circuits

Fall 2000 Schedule

C. J. Spanos

WEEK	LECTURE TOPICS	READING	LAB
Week 1	**Basics**		*no lab*
	1. 8/28 overview; silicon as an electronic material	HS Chap. 1; Chap. 2.1-2	
	2. 8/30 donors and acceptors; drift current density	HS 2.3-2.4.2	
	3. 9/1 diffusion current, total current density	HS 2.4.3-2.4.4	
Week2	**IC Fabrication Technology**		*Exp. 1*
	9/4 Labor Day Holliday		
	4. 9/6 fabrication and layout	HS 2.5	
	5. 9/8 IC resistors, sheet resistance	HS 2.6	
Week 3	**Electrostatics and IC Capacitors**		*Exp. 2*
	6. 9/11 applied electrostatics, the metal-metal capacitor	HS 3.1	
	7. 9/13 pn junctions in thermal equilibrium	HS 3.2-3	
	8. 9/15 pn under reverse bias	HS 3.4.1-2, 3.5	
Week 4			*Exp. 3*
	9. 9/18 pn junction capacitor	HS 3.6	
	MOSFETs		
	10. 9/20 MOS conceptual overview	HS 3.7	
	11. 9/22 MOS electrostatics	HS 3.8	
Week 5			*Exp. 4*
	12. 9/25 MOS C-V curves	HS 3.	
	13. 9/27 9MOSFET symbols and operation	HS 4.1-3	
	14. 9/29 MOSFET large-signal and small-signal models	HS 4.3,5	
Week 6			*Exp. 5*
	15. 10/2 MOSFET small-signal models (cont.)	HS 4.5	
	16. 10/4 MOSFET wrap-up, SPICE models	HS 4.	
	pn Junction Diodes		
	17. 10/6 pn junction diode under forward bias	HS 6.1-6.3.1	
Week 7			*no lab*
	18. 10/9 law of the junction; minority carrier currents	HS 6.3.2-6.3.4	
	19. 10/11 circuit models, diffusion capacitance	HS 6.4-5	
	Midterm I. Wednesday 10/11, 6-7:30 pm in Sibley		
	Bipolar Junction Transistors		
	20. 10/13 Bipolar transistors in forward active bias	HS 7.1-2	
Week 8			*Exp. 6*
	21. 10/16 Saturation, Ebers-Moll model	HS 7.3-4	
	22. 10/18 Small-signal BJT model	HS 7.5	
	Integrated-Circuit Amplifiers		
	23. 10/20 Amplifier concepts; 2-port parameters	HS 8.1	

WEEK	LECTURE TOPICS	READING	LAB
Week 9			*Exp. 7*
	24. 10/23 Common source amplifiers	HS 8.3,5	
	25. 10/25 Common gate amplifiers	HS 8.8.2	
	26. 10/27 Common drain amplifiers	HS 8.9.2	
Week 10			*Exp. 8*
	27. 10/31 Bipolar amplifier stages	HS 8.2,8.1,9.1	
	28. 11/1 Summary of single stage amps	HS 8.1-9	
	Frequency Response		
	29. 11/3 Phasor representation of signals	HS 10.1 + reader	
Week 11			*Exp. 9*
	30. 11/6 Transfer functions and Bode plots	HS 10.1	
	31. 11/8 Device models; current gain	HS 10.2-3	
	11/10 Veteran Day Holliday		
Week 12			*no lab*
	32. 11/13 Voltage gain amps; Miller approx.	HS 10.4.1-3	
	33. 11/15 Voltage and current buffer f response	HS 10.5-6	
	Midterm II. Wednesday, November 15, 6-7:30 pm in Sibley		
	Multistage Amplifiers		
	34. 11/17 Multistage amplifiers	HS 9.1-2	
Week 13			*Exp. 10*
	35. 11/20 Direct coupled amplifiers; DC level shifting	HS 9.3	
	36. 11/22 DC voltage supplies	HS 9.4.1	
	11/24 Thanksgiving Holliday		
Week 14			*Exp. 11*
	37. 11/27 DC current supplies	HS 9.4.3-4	
	Multistage Amplifier Frequency Response		
	38. 11/29 Multistage amplifier examples	HS 9.5	
	39. 12/1 Open-circuit time constants	HS 10.4.4	
Week 15			*Make up labs*
	40. 12/3 Multistage amp frequency response	HS 10.7	
	41. 12/5 Voltage amplifier example	HS 10.7.2	
	42. 12/8 Course review		

Final Examination: Wednesday, December 13, 12:30-3:20, location TBA

HS: R. T. Howe and C. G. Sodini, *Microelectronics: An Integrated Approach*, Prentice Hall, 1997.
Reader: EE 105 course reader, available at Copy Central