

Syllabus 8/26/2003

EE556 Fundamentals of Semiconductors Alan Seabaugh Fall 2003

Texts: Advanced Semiconductor Fundamentals R.F. Pierret
 Understanding Semiconductor Devices W. R. Frensley CD (\$25.)
 Selected papers

Office Hours: by request - sign-up 631-4473 seabaugh.1@nd.edu

Date	Topic	Pierret	Frensley	Paper
26-Aug	Crystal Structure	1-20		
28-Aug	Elements of quantum mechanics	25-38		
2-Sep	Quantum wells	38-49		
4-Sep	Energy bands	53-73		
9-Sep	Bandstructure/effective mass	73-86	5	
11-Sep	Carrier statistics	91-115	6	
16-Sep	Carrier concentrations, heavy doping	115-133	7	
19-Sep	Shockley-Read-Hall recombination	139-155		
23-Sep	Excess carriers	155-175		
25-Sep	Carrier transport	181-203		
30-Sep	Diffusion and Einstein's relation	203-217		
2-Oct	Properties of Si and Ge			Conwell
7-Oct	Cyclotron resonance			Dresselhouse, Kip, and Kittel
9-Oct	Haynes and Shockley experiment			Haynes and Shockley
14-Oct	Midterm EXAM			
16-Oct	Tunneling			Esaki
21-Oct	Midsemester break			
23-Oct	Midsemester break			
28-Oct	Hall effect			ASTM F76
30-Oct	Classical transport theory		165-171	
4-Nov	Barrier-limited and space-charge-limited current		171-183	
6-Nov	Induced terminal currents		183-189	
11-Nov	Noise		190-200	Ramo/Johnson
13-Nov	Impact ionization			
18-Nov	Young's modulus and strain			
20-Nov	Phonons			
25-Nov	Quantum transport			
27-Nov	Thanksgiving holiday			
2-Dec	Measurements - 4-point probe, TLM, dielectrics			
4-Dec	Current topics			
9-Dec	Last class day			
TBD	FINAL EXAM			

Homework: Assigned weekly - problems may be discussed freely unless directed otherwise.

Grading: Homework (20%), Midterm (30%), Final Exam (50%)

Good books: Solid State Physics, N.W. Ashcroft and N. D. Mermin; Semiconductor Physics, K. Seeger; Electrons and Holes in Semiconductors, W. Shockley; An Introduction to Solid State Physics, C. Kittel; Solid State and Semiconductor Physics, J. P. McKelvey; S. Sze, Physics of Semiconductor Devices; Physical Properties of Semiconductors, C.M. Wolfe, N. Holonyak, G. Stillman.

