

ECE 135A: Semiconductor Physics

Fall 2006

Instructor: Ed Yu
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URL: <http://nanolab.ucsd.edu/class/ece135a>
(Announcements, problem sets, handouts, etc.)

Lectures: TuTh 9:30–10:50AM, Center 224B **Office hours:** M 1:00PM–2:00PM
Fr 9:00–10:00AM
or by appointment/drop-in

Required Text: Michael Shur, Physics of Semiconductor Devices (Prentice Hall, 1990).

Additional references:

- R. F. Pierret, Semiconductor Device Fundamentals (Addison-Wesley, 1996).
- B. G. Streetman and S. Banerjee, Solid State Electronic Devices, Fifth Edition (Prentice-Hall, 2000).
- S. M. Sze, Physics of Semiconductor Devices, Second Edition (John Wiley & Sons, 1981).
- S. Wang, Fundamentals of Semiconductor Theory and Device Physics (Prentice Hall, 1989).

Grading: Grades will be computed using Option 1 and Option 2 below. You will receive the higher of your two computed grades.

	Option 1	Option 2	
Problem Sets	10%	0%	approximately one per week
Midterm 1	20%	25%	9:30-10:50AM, in class, Th October 19 (<i>tentative</i>)
Midterm 2	20%	25%	9:30-10:50AM, in class, Th November 16 (<i>tentative</i>)
Final Exam	50%	50%	8:00AM-11:00AM, Th December 7

Note: If an exam regrade is requested, the entire exam may be regraded by the course instructor!

Policy on collaboration: See course handout on Academic Integrity, and information on web site.

Course Topics:

<i>Topic</i>	<i>Reading (Shur)</i>
Semiconductor material properties	
Basics of quantum mechanics	Sections 1.1-1.3
Crystal structure, band structure, Brillouin zones	Sections 1.4-1.5
Semiconductor statistics and transport	Sections 1.6-1.12
<i>pn</i> junctions	
Brief review of <i>pn</i> junction behavior	Sections 2.1-2.6, 2.8
<i>pn</i> junction diodes for optoelectronic devices	(Chapter 5)
Tunnel diodes	Section 2.7
Schottky and Ohmic contacts; heterojunctions	
Schottky contacts	Sections 2.9-2.10
Ohmic contacts	Section 2.11
Heterojunctions	Section 2.12
Additional topics as time permits	