

ENEE 601 SPRING 2007
SEMICONDUCTOR DEVICES AND TECHNOLOGY

INSTRUCTOR: Prof. Martin Peckerar
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GRADER: TBD

MAIN TEXT: Fundamentals of Modern VLSI Devices, Taur & Ning, Cambridge Press, 2002

REFERENCE TEXTS: Device Electronics for Integrated Circuits, 3rd ed, Muller, Kamins & Chan, Wiley Interscience 2003

The Pierret Series in Semiconductor Technology, Addison-Wesley Press. This is an outstanding series of “monographs” on various topics related to the course: semiconductor physics, bipolar and MOS transistors, fabrication, etc.

COURSE TOPICS

1. An introduction to semiconducting materials
2. Some quantum mechanics of solids and charge transport
3. Topics in process technology
4. Two terminal devices: resistors, diodes (Schottky and junction)
5. Junction transport phenomena
6. Bipolar transistor basics
7. Second order effects in bipolar devices
8. Advanced bipolar devices – SiGe
9. MOSCAPs
10. MOSFETs – 1st order models
11. MOSFETs – 2nd order models
12. Advanced topics in component technology: CCDs, wide-bandgap materials, high electron mobility transistors (HEMTs), dual gate structures (FINFETs, etc.)
13. Issues in scaling – What happened to Moore’s Law?