ECE609 Semiconductor Devices
Spring 2006

Instructor: Prof. Eric Polizzi
Office: Marcus 201C
Day and Time: M-W-F 10:10-11:00
Place: Marston 220
Office Hours: M-W-F 2:00-3:00

Prerequisite: A solid state or quantum mechanics undergraduate course is recommended
Textbook: J.P. Colinge and C. A. Colinge, "*Physics of Semiconductor Devices*", (Kluwer Academic, Boston, 2002).
Suggested Reading:

- C. Kittel, "*Introduction to Solid State Physics*", Fourth Edition (John Wiley and Sons, New York, 1971).
- S. M. Sze, "*Semiconductor Devices: Physics and Technology*", (John Wiley and Sons, 1985).
- Y. Taur and T. H. Ning, "*Fundamentals of Modern VLSI Devices*", (Cambridge University Press, New York, 1998)
- On-line ECE-609 spring05 lectures notes of Prof. Max Fischetti

Grading:			
	Homework	30%	(~6 homeworks due approximately every 2 weeks)
	Midterm	30%	(on chapters 1-2)
	Final	40%	(all the chapters)

Purpose of the Course:

- Provide the foundations to understand what is a semiconductor
- Provide the foundations to understand the electronic properties and the physics of charge transport in semiconductors
- Explain the operating principles semiconductor devices
- Perspectives of emerging device technology

Outline:

I. Physics of Semiconductors:
   1 Review of quantum mechanics
   2 Energy band theory
   3 Theory of electrical conduction

II. Two-Terminal devices
   1 P-N junctions
   2 Metal-semiconductors contacts
   3 MOS capacitors

III. Three-Terminal devices
   1 Bipolar junction transistor
   2 MOSFET

IV . Nanoscale semiconductor devices
   1 Review of quantum effects in semiconductors
   2 Introduction to quantum transport