Department of Electrical & Computer Engineering
Louisiana State University

EE 7272 **Semiconductor Devices II: Field Effect** **Spring 2004**
(2:40 –3:30 PM 149 EE Building)

Catalog Description: Surface effects; metal-insulator-semiconductor structures; modeling of MOS capacitors and IFGETs.
Prerequisites: EE 3232 or equivalent.
Text: Y. P. Tsividis, "Operation and Modeling of the MOS Transistors," Oxford Univ. Press, 2nd Ed 1999.
Reference Material: In Reserve section of Middleton Library (1 day loan)

1. S. M. Sze, "Physics of Semiconductor Devices," 2nd Ed, Wiley 1981.
2. E. Nicollian and J. Brews, "MOS Physics and Technology," Wiley, 1982.
3. S. Wolf, "Silicon Processing for the VLSI Era," Vol. 3, Lattice Press 1995.
4. R. Muller and T. Kamins, "Device Electronics for Integrated Circuits," 2nd Ed., Wiley 1986.
5. G. Massobrio and P. Antognetti, "Semiconductor Device Modeling with SPICE," 2nd Ed.,McGraw Hill 1993.

Instructor: Dr. Pratul Ajmera, 221 EE Building. Ph: 578-5620. E-mail: ajmera@ece.lsu.edu
Office Hours: MWF: 9-10 AM and MW: 3:35-4:35 PM. Other times by appointment.
Goals: The course provides in-depth understanding of the physics and operation of modern insulated field-effect transistors. It also provides understanding of operation of other field effect devices such as junction FET and the Schottky FETs.
Prerequisite by Topics:

1. Physics of p-n junction diodes.
2. Basic understanding of operation of field-effect devices and their terminal behavior.

Syllabus:

1. MOS transistor fabrication basics (2 classes)
2. Two-terminal MOS structure and physics of MOS capacitor – Ch. 2 (9 classes)
3. Three-terminal MOS structure – Ch. 3 (2 classes)
4. Four-terminal MOS transistor – Ch 4 (5 classes)
5. Short channel and narrow channel effects – Ch. 6 (6 classes)
6. Ion-implanted channels – Ch. 5 (2 classes)
7. Circuit Modeling of MOSFETs – Ch. 10 (6 classes)
8. Junction FETs – (3 classes)
9. Schottky FETs – (3 classes)
10. Charge –coupled devices – (2 classes)

The indicated class times for each topic are estimates and may be changed somewhat depending on student preparation and need.
Grading:

Test 1	30%	Mon, March 1
Test 2	30%	Fri, April 2
Final Exams	40%	Sat, May 15
	100%	

Home Assignments will be given but not graded.