TO: The Faculty of the College of Engineering

FROM: School of Electrical and Computer Engineering of the College of Engineering

RE: ECE 55700 Changes in Title and Description

The faculty of the School of Electrical and Computer Engineering has approved the following changes in ECE 55700. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From: **ECE 55700 – Integrated Circuit Fabrication Laboratory**
Sem. 1 and 2. Class 1, Lab 5, cr. 3.
Prerequisite: ECE 30500. Masters Student Standing or higher; Limited registration. Authorized equivalent courses or consent of instructor may be used in satisfying course pre- and co-requisites. Instructor approval required.

Laboratory exercise in the fabrication and testing of silicon integrated circuits. Both bipolar and MOS integrated circuit test chips are fabricated and tested. Laboratory technique, the technology of integrated circuit fabrication, and electrical characterization are emphasized.

To: **ECE 55700 – Integrated Circuit/MEMS Fabrication Laboratory**
Sem. 1 and 2. Class 1, Lab 5, cr. 3.
Prerequisite: ECE 30500 or Graduate Standing. Permission of instructor required.

Laboratory exercises in the fabrication and testing of silicon integrated circuits and MEMS devices. Two test chips are fabricated and tested, i.e. (i) diode test chip and (ii) MOSFET test chip or a MEMS switch test chip. Laboratory technique, the technology of integrated circuit and MEMS fabrication, and device characterization are emphasized. Computer simulation is performed with the projects.

Reason: The title and description of this course were changed to better reflect the evolving course content.

ECE 55700 – Integrated Circuit/MEMS Fabrication Laboratory

Required Text (s):

- *The Science and Engineering of Microelectronic Fabrication*, 3rd Edition, S. A. Campbell, Oxford University Press, 2008, ISBN No. 9780195320176.
- Course Notes on MEMS

Recommended References:

1. *Modular Series on Solid State Devices, Volume V: Introduction to Microelectronic Fabrication*, Richard C Jaeger, Addison-Wesley, 1988.
2. *VLSI Technology*, S. M. Sze, McGraw-Hill.
3. *Microsystem Design*, S. Senturia, Kluweer Academic Press.
4. *Silicon Processing for the VLSI Era*, S. Wolf and R. N. Tauber, Lattice Press.
5. *Fundamentals of Microfabrication*, 2nd Edition, M. Madou, CRC Press.
6. *Micromachined Transducers* Source Book, G. Kovacs, McGraw-Hill.

Course Outline:

Weeks	Principle Topics
1	Course/Lab Introduction
2	Overview of Microelectronic and MEMS Fabrication
3	Electronic Device Fundamentals
4	Oxidation
5	Diffusion
6	Ion Implant
7	Lithography
8	Etching
9	Thin Films
10	Simulation/SUPREM/MINIMOS/ANSYS
11	MEMS Processing Modules 1
12	MEMS Processing Modules 2
13	BioMEMS Processing Modules
14	MEMS Device Examples

15	Manufacturing and Yield

Laboratory Outline:

Weeks	Topic
1-9	3 mask diode fabrication process
7-15	4 mask PMOS fabrication process OR 4 mask MEMS metal cantilever/switch fabrication process

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