**EECE 4410: Integrated Microelectronic Circuits**

**Credits and contact hours:** 3 credits, three 50 minute class periods per week

**Course Coordinator:** Chung Hoon Lee

**Course Materials:**

**Required:** Richard C. Jaeger, Introduction to Microelectronic Fabrication, second edition,

Prentice Hall, 2002.

David A Hodges and Horace G Jackson, Analysis and Design of Digital Integrated Circuits, second edition, McGraw Hill, 1988.

**Course Description:**

Basic processing and fabrication technology of integrated circuits, passive components and their parasitic effects, MOS transistors, bipolar transistors and diodes, design of silicon integrated circuits. Emphasis is placed on the design of circuits to meet given requirements.

**Prerequisites:** EECE 3010 and EECE 2030.

**Selected Elective:**  in ELEN Electronic Devices and Systems area, COEN Hardware area (breadth & depth).

**Contribution to Professional Component:** Engineering Science 50%, Engineering Design 50%

**Course Goals:**

The objective of this course is to provide the student a good understanding of the design and fabrication of semiconductor integrated circuits.

**Course Objectives:**

By the end of this course, you should be able to...

1. Determine dopant materials and their concentrations required to obtain n and p type

materials of desired electrical properties.

2. Clearly describe and explain the basic theory and applications of' various processing steps such as lithography, oxidation, diffusion, etc. that are utilized in the fabrication of an integrated circuit

3. Explain parasitic effects that occur in IC components, describe their undesirable effects, and devise techniques that can be used to minimize these problems.

4. Generate the layout and develop flow chart for the fabrication of' a bipolar and/or MOS transistor.

5. Analyze and design logic circuits based on NMOS and CMOS technologies.

**Contribution to Program Objectives:** partial fulfillment of Criterion 3 objectives A, C, E,

I, K

**Course Topics:**

Overview of Microelectronic Fabrication Chap. 1: Jaeger

Lithography Chap. 2: Jaeger

Thermal Oxidation of Silicon Chap. 3: Jaeger

Diffusion Chap. 4: Jaeger

Introduction to Digital Electronics Chap. 1: Hodges and Jackson

MOS transistors Chap. 2: Hodges and Jackson

MOS invertors and Gate Circuits Chap. 3: Hodges and Jackson