Department of Electrical and Computer Engineering
EENG 406
INTRODUCTION TO INTEGRATED CIRCUIT ENGINEERING

[ ] Required  [x] Elective

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<td>07/08</td>
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Coordinator: Claudio Talarico, Professor, Electrical and Computer Engineering

Catalog Description: Structural design of digital integrated circuits in MOS technology; layout, design rules, fabrication techniques; use of computer automated design and simulation tools, and high-level description language. Three hours lecture per week. Prerequisites: CPEN 231 and EENG 304.

Prerequisites by Topic:
1. Microcomputer programming and architecture
2. Electronics

Textbook(s) / Require Mat’l:

Course Topics:
1. MOS transistors (10%)
2. MOS processing (10%)
3. Circuit characterization and performance (10%)
4. CMOS circuit design (15%)
5. Structured design (10%)
6. Design examples (10%)
7. CAD and symbolic layout (15%)
8. Hardware description language (10%)
9. Tests and Review (10%)

Course Objectives:
1. To teach students the basics of MOS devices and integrated circuit design
2. To provide students an understanding of IC layout techniques and CAD tools
3. To provide students an understanding of IC fabrication techniques
4. To teach students the use of hardware description language for design and simulation
### Professional Components/Course Outcomes:

*By the end of this course the student will be able to:*

1. demonstrate knowledge of MOS devices and integrated circuit design.
2. demonstrate knowledge of IC layout techniques.
3. demonstrate knowledge of IC design software and methods.
4. demonstrate ability to utilize commercial computer software to implement IC layout.
5. demonstrate ability to utilize hardware description language for design and simulation.

### Class/Lab Schedule:

- 150 minutes of lecture each week; 3 x 50 minute or 2 x 75 minute sessions
- 3 credit hours

### Relation to Program Outcomes:

- (a) Fundamental math, science, or engineering
- (b) Experimentation
- (c) Design
- (d) Teamwork
- (e) Problem solving
- (f) Professional ethics
- (g) Communication
- (h) Global awareness
- (i) Life-long learning
- (j) Contemporary issues
- (k) Modern tools

### Computer Tools:

Software used includes Synopsys HSPICE, Synopsys Design Compiler and Synopsys Galaxy.

### Laboratory Content:

None

### Design Content:

Design issues are addressed.

### Relation to Curriculum:

- Curricular Component
  - Elect. Power/Power Syst.
  - Computer
  - Math/Science
  - EM/Circuits/Elect./Filters
  - Controls/Automation
  - Design
  - Other Engineering
  - Foundational
  - Intermediate
  - Advanced