EE 4310C  Digital Integrated Circuits

1. Catalog Description – (3 credits) Analysis and design of digital circuits using MOS and bipolar devices

2. Pre-requisites - EEE 3308, EEL 3396, EEL 3701

3. Course Objectives - This course focuses on analysis and design of modern digital circuits. Transistors are introduced and described from a digital point of view, and the performance of various circuits is derived and estimated. CMOS digital circuits will be introduced and analyzed. Students will investigate and design digital circuits using L_EDIT and SPICE.

4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) - 3 credits of Engineering Design

5. Relationship of course to program outcomes: Skills student will develop in this course (ABET only undergraduate courses) - EE2, a, c, e, I, k

6. Instructor – Dr. Scott Thompson
   a. Office location: 535 New Engineering Bldg
   b. Telephone: 846-0320
   c. E-mail address: thompson@ece.ufl.edu
   d. Class Web site: https://lss.at.ufl.edu/
   e. Office hours: Thurs 10:30 - 11:30 a.m.

7. Teaching Assistant - Srivatsan Parthasarathy
   a. Office location:
   b. Telephone:
   c. E-mail address: srivatsan.parthasarathy@gmail.com
   d. Office hours:

8. Meeting Times – T 2nd-3rd, R 3rd

9. Class/laboratory schedule - 3 class periods consisting of 50 minutes each

10. Meeting Location – 330 Larsen

11. Material and Supply Fees - None

12. Textbooks and Software Required -
   a. Title: CMOS Digital Integrated Circuits, Analysis and Design
   b. Author: Kang and Leblebici
   c. Publication date and edition: McGraw-Hill, 2003 or equivalent
   d. ISBN number:
13. Recommended Reading - None
   a. Title:
   b. Author:
   c. Publication date and edition:
   d. ISBN number:

14. Course Outline (provide topics covered by week or by class period) –
   - MOS device physics, substrate bias effects, scaling, and SPICE
   - MOS capacitances
   - CMOS fabrication, process flow, and design rules
   - Static CMOS inverter
   - CMOS inverter dynamic response
   - Load and interconnect RC estimation
   - Short channel effects on CMOS inverter
   - Static CMOS combinational logic
   - Ratioed logic and pass transistor logic
   - Dynamic logic, sequential logic & timing, and memory circuits

15. Attendance and Expectations - Due to quantity and research nature of material, it is
    important to make every attempt to attend class or watch all class lectures (when
    possible). Requirements for class attendance and make-up exams, assignments, and
    other work are consistent with university policies that can be found at:
    https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

16. Grading –
   a. 85%
      i. 20% Exam 1: Feb 2 Thursday
      ii. 20% Exam 2: March 6 Tuesday
      iii. 20% Exam 4: April 3 Tuesday
      iv. 25% Comprehensive final exam (May 3 Thursday 10:00-12:00 AM)
   b. 10% Project
   c. 5% Homework:

17. Grading Scale - ≥90% → A; ≥86.67% → A-; ≥83.33% → B+; ≥80% → B;
    ≥76.67% → B-; ≥73.33% → C+; ≥70% → C; ≥66.67% → C-; ≥63.33% → D+;
    ≥60% → D; ≥56.67% → D-; <56.67% → E

   “A C- will not be a qualifying grade for critical tracking courses. In order to graduate,
   students must have an overall GPA and an upper-division GPA of 2.0 or better (C or
   better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not
   satisfy this graduation requirement. For more information on grades and grading
   policies, please visit:
   https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx
18. Make-up Exam Policy – If you have a University-approved excuse and arrange for it in advance, or in case of documented emergency, a make-up exam will be allowed. For information on UF policies concerning attendance, please visit: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx#absences

19. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

20. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

21. UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
   · UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
   · Career Resource Center, Reitz Union, 392-1601, career and job search services.

22. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.