

Department of Electrical and Computer Engineering

EEE4343 - Introduction to Digital Electronics Fall 2021

Instructor : Dr. Hai Deng
Office Hours : by appointment
Monday 1:00pm-3:00pm
Friday 1:30 pm -3:30 pm

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Section/Classroom/Time
: U01/EC1104/Friday 4:00pm-6:50pm

Canvas Web Page : <http://web.eng.fiu.edu/dengh/>

Catalog Description:

This course focuses on digital electronics. BJT as a switch, CMOS and other advanced logic-gate circuits, data converters, switched capacitor filters, semiconductor memories. (3 Credits)

Reference Textbooks:

1. Sung-Mo (Steve) Kang, Yusuf Leblebici, and Chul Woo Kimi, *CMOS Digital Integrated Circuits: Analysis and Design*, the McGraw-Hill Companies, Inc., New York, 4th edition, 2014.
2. Lecture Notes

Course Objectives:

Through successful completion of the course, the students will:

1. Learn the basic principle of MOS transistor
2. Be capable to perform MOS transistor simulation using SPICE
3. Understand static and switching characteristics of MOS circuits
4. Perform design and analysis of CMOS logic circuits
5. Perform design and analysis of dynamic logic circuits
6. Be familiar with advanced topics in digital electronics and VLSI design

ABET Relationship of course to program outcomes:

- 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- 3. an ability to communicate effectively with a range of audiences.
- 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Grading Scale:	the University's Code of Academic Integrity http://academic.fiu.edu/academic_misconduct.html	
A	92-100	"Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook."
A-	90-92	
B+	88-90	
B	82-88	
B-	80-82	
C+	78-80	
C	70-78	
D	60-69	
F	< 60	

Department Regulations Concerning Incomplete Grades

To qualify for an Incomplete, a student:

1. Must contact (e.g., phone, email, etc.) the instructor or secretary before or during missed portion of class
2. Must be passing the course prior to that part of the course that is not completed
3. Must make up the incomplete work through the instructor of the course
4. Must see the Instructor. All missed work must be finished before last two weeks of the following term.

University policies: on sexual harassment, and religious holidays, and information on services for students with disabilities

<http://academic.fiu.edu/>

<http://drc.fiu.edu>

Policies:

- **Academic Misconduct:** For work submitted, it is expected that each student will submit their own original work. Any evidence of duplication, cheating or plagiarism will result at least a failing grade for the course.
- **Unexcused Absences:** Two unexcused absences are permitted during the term. More than two will result in the loss of points from your final grade. (**1 point** per absence above two, **3 points** per absence above 5).
- **Excused Absences:** Only emergency medical situations or extenuating circumstances are excused with proper documentation. After reviewing documentations and evidence you are **required to email** a description of the excuse and absence dates as a written record to hai.deng@fiu.edu.
- **On Time:** As in the workplace, on time arrival and preparation are required. Two “Lates” are equivalent to one absence. (Leaving class 15 minutes earlier than the scheduled time is counted as a “Late”)
- **Deadlines:** Work is due before midnight on the date specified. Late submissions within one week will receive up to a half of the full credit. After one week or more, late work will not be accepted. Late submissions are graded after the final exam. Participation deadlines are absolute – no late completions or makeups.
- **Submissions:** This class is paperless. Submissions are made using the web form listed on the class web site (both online and in class sections). All submissions must be (a) a single document, (b) web accessible by anyone and readable with a browser (c) accessible using a single URL reference.
- **Wireless Device Policy:** Usage of disruptive wireless devices such as cell phones or pagers in classroom is prohibited. One wireless violation will lead to a loss of one point. Three violations in one semester will automatically lead to a score “F”.

Grading Scale: NOTE: There are *no makeup exams* offered

Topic	Percentage
Exam 1 <i>no makeup</i>	20%
Exam 2 <i>no makeup</i>	25%
Final <i>no makeup</i>	25%
Project	15%
Homework	10%
Participation Quiz	5%
Attendance	Unexcused absence penalty based on class policy

Wk	Date (Fri)	EEE 4343 Weekly Topics	Homework: Due
1	08/27/21	Introduction, semiconductor materials	
2	09/03/21	MOS transistors and integrated circuit fabrication	
3	09/10/21	Modeling of MOS transistor using SPICE.	HW01 Due
4	09/17/21	Static characteristics of MOS circuits (part I)	
5	09/24/21	Static characteristics of MOS circuits (part II)	HW02 Due
6	10/01/21	Dynamic characteristics of MOS circuits	
7	10/08/21	Combinational MOS logic circuits (part I)	
8	10/15/21	Combinational MOS logic circuits (part II) Sequential MOS logic circuits (part I)	HW03 Due
9	10/22/21	Sequential MOS logic circuits (part II)	
10	10/29/21	Dynamic logic circuits	HW 04 Due
11	11/05/21	Midterm	
12	11/12/21	Semiconductor memories	HW05 Due
13	11/19/21	Low-power CMOS logic circuit design	
14	11/26/21	Thanksgivings Holiday (No class)	
15	12/03/21	BiCMOS logic circuits Final class lecture Comprehensive class material review	HW06 Due
16	12/10/21	Final Exam Week (comprehensive) (Time: 2:15PM - 4:15PM)	