EEE 6323 Advanced VLSI Design, Spring 2019

Links will be enabled for reading and lecture materials during the semester

Course Outline (Subject to change): Note: classes are on Monday, Wednesday and Fridays. UF EDGE will make available videos of the lectures on line, but I give a better lecture with a big live audience.

Weekly Date, (No. of Classes) Class topics,

01/7, (3) Syllabus, Permission and Survey Form, Introduction to AVLSI (Lect. 1), CMOS Gate Design Review (Lect. 2 and 3), Homework 1

Reading: Weste Chapter 1,

In Class Notes 1, In Class Notes 2, In Class Notes 3,

01/14, (3) Layout (Lec. 4), DC and Transient Analysis (Lec. 5, Lect 6)

PUN Graph Example solved in class

PUN Graph Solution

In Class Notes 4, In Class Notes 5,

01/21, (2), Martin Luther King Holiday,,DC and Transient Analysis (Lec. 7), Logical Effort Lec. 8),

Homework 2

In Class Notes 6, In Class Notes 7, In Class Notes 8,

01/28 (3) Multi-Stage Logic (Lec 9) Multi-Stage Logic (Lec 10), Multi-Stage Networks (Lect 11)

Homework 3

In Class Notes 9, In Class Notes 10, In Class Notes 11

02/4, (3) Circuit Simulations, (Lect. 12), Power Dissipation (Lect 13-14),

Homework 1 Solution

Homework 2 Solution

3rd Edition Weste Problem Pages for Homework 3

Video solutions for Exercises 4.1 and 4.7, play with OneNotes

In Class Notes 12, In Class Notes 13, In Class Notes 14

02/11 (3), Low Power Design (Lect 15 - 16), Low Power Design II (Lect 17),

Homework 1 Solution

Homework 2 Solution

Homework 4

In Class Notes 15, In Class Notes 16, In Class Notes 17

02/18 (3), Low Power Design II (Lect 18), Digital Design Flow (Lect 19-20)

Homework 3 Solution

Exam 1 Solution 2017

Exam 1 Solution 2018

Microsoft OneNote Video Solution to Exam I 2016 play video by pressing video icon on top of page

In Class Notes 18, In Class Notes 19, In Class Notes 20

2/25 (3) Digital Design Flow II (Lect. 21), Exam I (Wednesday), Digital Design Flow III (Lect 22),

Homework 4 Solution

In Class Notes 21, In Class Notes 22,

03/4 (0) University of Florida Spring Break, March 4 to March 8, Have a great vacation, no classes.

03/11 (3), Circuit Families (Lect 23), Arithmetic Units (Lect 24), Advanced Arithmetic Units (Lect 25)

Homework 5

HW 5 Scripts

Exam 1 Solution 2019

AD VLSI Final Design project, Report Due Monday April 22, There will be design demos in the NEB lab on and after April 22, 2019

Group Project Summary: Due March 22, 2019

In Class Notes 23, In Class Notes 24, In Class Notes 25

03/18 (3) Advanced Arithmetic Units (Lect 26) Datapaths (Lect 27) Clock Distribution (Lect. 28)

In Class Notes 26, In Class Notes 27, In Class Notes 28

03/25 (3) Sequential Circuit Design (Lecture 29-30), Sequential Circuit Design 2 (Lect 31)

AVLSI Homework 6, Due April 8, 2019.

Exam II Solution 2016

Exam II Solution 2017

Exam 2 will be on April 19, 2019 (There is no final)

In Class Notes 29, In Class Notes 30, In Class Notes 31

04/1 (3) Arrays (Lect 33), IO Circuits (Lect 33-34),

In Class Notes 32, In Class Notes 33, In Class Notes 34

04/8 (3) PLL/DLL design (Lect. 35) VLSI Test (Lect. 36- 37)

Homework 6 Solution

Lecture 11 Power Notes with markings

In Class Notes 35, In Class Notes 36, In Class Notes 37

04/15 (3), VLSI Test (Lect. 38), Intel Processor Case Study (Lect. 39) EXAM 2 (Friday)

In Class Notes 38, In Class Notes 39

04/22 (1) Special sub-systems (Lect 40) **Tuesday and Wednesday, will be for Project Evaluations in NEB Computer lab and via Skype for EDGE students.**

There will be NO Final Exam.

Professor: William R. Eisenstadt,
Office: 529 NEB
Telephone: (352) 392-4946
Facsimile: (352) 392-8381
E-mail: wre@tec.ufl.edu
Web: http://www.tec.ufl.edu/~wre/

Administrative Assistant: TBA
Office:
Telephone:
Facsimile:
E-mail:

Class Period and Location: Period 8, MWF, 3:00pm to 3:50pm, Room NEB 201

Office Hours: MWF 12:00pm to 12:40pm and 2:00pm to 2:50pm

Graders: Yingjie Chen, CHENYINGJIE@UFL.EDU, Office hours: MWF 4pm to 5pm, Location TBA

Required Texts: Neil H.E. Weste, David Harris, "CMOS VLSI Design, A Circuits and Systems Perspective," 3rd Edition, Pearson, Addison-Wesley, 2005. ISBN 0-321-14901-7.

In addition, handouts developed by instructor may be downloaded from Canvas.

Recommended Text: Jan. M. Rabaey, A. Chandrakasan, and B. Nikolic, "Digital Integrated Circuits, A Design Perspective," 2nd Edition, Prentice Hall, 2003

Prerequisites: EEE 5322 is required or two years of industry IC design experience. No exceptions. You will need to be proficient in Cadence the first day of class.

Course Goals: To develop a basic understanding of CMOS integrated circuit design. To develop proficiency in analysis, design and implementation of CMOS circuits. To develop a basic understanding of design considerations to maximize chip success.

Course Materials: I will be using the Syllabus to index of the daily class materials posted for you to review and to learn from. So, you can find most learning materials by clicking on a link from the Syllabus. I try to post all written materials and video materials used in the lectures to assist in your learning. I also post class lecture materials at least 24 hours ahead of time. I post 2 years of old exams a week before the in class exam. There will be folders that contain course materials.

Course Website: The course is on the Canvas system: http://elearning.ufl.edu/

Computer and Software Required:
Workstations in the NEB 2nd floor ECEL lab with CADENCE Design system will be used

throughout the course. All students are required to have a Gator link account and use Canvas for course handouts, grade information, course notices, etc., see e-learning support services

Course Study Requirements:
Students are responsible to study all in class materials including those written on the board and presented orally, all Class Handouts all assigned readings, all projects and homework. Absence from class can result in missing materials tested on exams.

Attendance and Expectations: There is a no wireless device policy (no cell phones, smart phones, computers, tablets, etc.) during exams.

"Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx."

Catalog Description: Advanced very large scale integrated circuit design, testability, and performance evaluation. Use of industrial VLSI software. Building an advanced CMOS VLSI circuit.

Make Up Exam Policy: Students are expected to attend exams at the scheduled times. Exams can be made up if there is a genuine medical emergency with a doctor's or clinic medical note or a family emergency with some documentation. Students are NOT excused from exams for job interviews and early holiday travel home. Students with other non-emergency exam scheduling issues must obtain permission from the instructor prior to missing an exam.

Work Requirements:

Homework Sets (6)
Final project
Exams: Exam1, Exam 2

Assignment	Total Points	Percentage of Final Grade
Homework Sets	10 points each	10%
Final Project	100 points total for all parts	30%
Exam 1	100	30%
Exam 2	100	30%
		100%

Tentative Grading Policy, I will look carefully at each individual's class work accomplishments.

Percent	Grade	Grade Points
93 - 100	A	4.00
90 - 92	A-	3.67
87 – 89	B+	3.33
83 - 86	B	3.00
80 - 82	B-	2.67
77 - 79	C+	2.33
73 - 76	C	2.00
70 - 72	C-	1.67
67 - 69	D+	1.33
63 - 66	D	1.00
60 - 62	D-	0.67
0 - 59	E	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Current UF Grading Policy for assigning grade points

https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received

unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students 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.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.