

ECE 423 Syllabus¹

Fall 2013

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Office Hours: MTWR 1:00 pm – 2:30 pm

Lecture: MTWR 3:40 pm - 4:55 pm, Engineering, A Wing 0219

Lab: E-132,

Grading/Evaluation:

Two exams	20% each
Final exam	25%
Labs	35%

Completing the exams in the designated time is an essential part of course requirements!

Classroom Policies:

- A. **Attendance Policy:** Attendance will be taken for statistical purposes, does not count towards grade but the students are expected to attend. Exam days and lab assignments will be announced in the class and students are responsible for obtaining that information.
- B. **Late Homework/Missed Exams:** If a student miss an exam for a serious reason (illness, etc) a make-up exam will be provided. There are restrictions for the date and time; please contact as soon as possible the instructor. If the instructor is not notified early enough, the points obtained for the particular exam will be zero.
- C. **Mobile Technology Policy** “N/A”.

Textbook: CMOS VLSI DESIGN (A Circuits and Systems Perspective)
Fourth Edition
Neil H.E. Weste, David Money Harris
ISBN-10: 0-321-54774-8

Course Topics

- MOS transistor theory
- Standard CMOS design
- CMOS processing technology and Layout Design
- Circuit Characterization and Performance estimation
- CMOS Logic Structures
- Basic memory elements
- Design of VLSI Sequential Systems
- Subsystem design
- Memory

¹ Pages 2 and 3 are for ABET

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1. **Course number and name:** ECE 423 Digital VLSI Design
2. **Credits and contact hours:** 4 credits, One 50-minute session per week, Ten 2-hour Lab sessions with CADENCE, Lab project
3. **Course Committee:** H. Wang, S. Tragoudas, S. Ahmed
4. **Text book(s), title, author, and year:**
CMOS VLSI DESIGN (A Circuits and Systems Perspective)
Fourth Edition
Neil H.E. Weste, David Money Harris
ISBN-10: 0-321-54774-8

References or other supplemental materials:

- [1] Digital Integrated Circuits: A Design Perspective, Jan M. Rabaey, Prentice Hall, Inc., 1996
- [2] CMOS Digital Integrated Circuits: Analysis and Design, S.-M. Kang and Y. Leblebici, 2nd Edition, McGraw-Hill, Inc., 1999
- [3] Basic VLSI Design, D.A. Pucknell and K. Eshraghian, 3rd Edition, Prentice-Hall, Inc., 1994

5. Specific course information

- a. (catalog description): Principles of the design and layout of Very Large Scale Integrated (VLSI) circuits concentrating on the CMOS technology. MOS transistor theory and the CMOS technology. Characterization and performance estimation of CMOS gates. CMOS gate and circuit design. Layout and simulation using CAD tools. CMOS design of data-path subsystems. Design of finite state machines. Examples of CMOS system designs. Laboratory experience in CMOS VLSI design
- b. prerequisites or co-requisites: ECE 327 and ECE 345
- c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program: Elective
- d. Professional Component {Credit Hours}

Mathematics	0	Sciences	0	General Ed.	0
<u>Eng. Science</u>	<u>2</u>	<u>Eng. Design</u>	<u>2</u>		

6. Instructional Objectives (with SO's), ex. The student will be able to explain the significance of current research about a particular topic. (a, b, h)

The student is expected to have a clear understanding of:

- 1) MOS Transistor Theory (e)
- 2) Standard CMOS Design, (e,b)
- 3) CMOS Processing technology and Layout Design (e,b,c)
- 4) Circuit Characterization and Performance estimation (b,e,k)
- 5) CMOS Logic structures (e,b,k)
- 6) Basic memory elements (e,b)
- 7) Design of VLSI Sequential Systems (e,b,c,k)
- 8) Subsystem design (e,b,c,k)
- 9) Memory (e,b,c)

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7. Brief list of topics (class, lab and project) to be covered (with hours)²

- a. Classroom Topic (classes)
 - 1. MOS Transistor Theory 3 classes
 - 2. Standard CMOS Design, 4 classes
 - 3. CMOS Processing technology and Layout Design 4 classes
 - 4. Circuit Characterization and Performance estimation 4 classes
 - 5. CMOS Logic structures 7 classes
 - 6. Basic memory elements 4 classes
 - 7. Design of VLSI Sequential Systems 6 classes
 - 8. Subsystem design 7 classes
 - 9. Memory 6 classes
- b. Laboratory Topics (Hours)
 - 1) Ten two hours session 20 Hours
- c. Projects

8. Assessment of the Contribution to Student Outcomes

Outcome →	a	b	c	d	e	f	g	h	i	j	k
Assessed →		x	x		x						x

² subject to change at the instructor's discretion

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University Policies

- A. **Incomplete Grades:** An *INC* is assigned when, for reasons beyond their control, students *engaged in passing work* are unable to complete all class assignments. An *INC* must be changed to a completed grade within a time period designated by the instructor but not to exceed one year from the close of the term in which the course was taken, *or graduation*, whichever occurs first. Should the student fail to complete the course within the time period designated, not to exceed one year, or graduation, whichever comes first, the incomplete will be converted to a grade of *F* and the grade will be computed in the student's grade point average. Students should not reregister for courses in which an *INC* has been assigned with the intent of changing the *INC* grade. Re-registration will not prevent the *INC* from being changed to an *F*.
- B. **Academic Integrity:** You are expected to submit your original work and adhere to the academic policies as stated in the SIU Student Conduct Code: <http://srr.siu.edu> (listed under Additional Links). Any act of academic dishonesty, cheating, or plagiarism in any form, including anonymous internet sources used in student papers, will be reported. These acts are taken seriously and the consequences may range from failing an assignment to expulsion from the university.
- C. **SIU Email:** Your SIU email account is an official form of University communication. Your instructor will use SIU email as a primary means of electronic communication with students. Please make sure that you maintain a valid password and acquire the habit of regularly checking your SIU email account for important instructor and University announcements. You may view the official SIU Student Email Policy at: <http://policies.siu.edu/policies/email.html>.
- D. **Emergency Procedures:** SIU is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with SIU Emergency response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on BERT's website at <http://www.bert.siu.edu/>, the SIU Department of Public Safety's website www.dps.siu.edu (disaster dropdown and video, "Shots Fired"), and in the Emergency Response Guideline pamphlet. Know how to respond to each type of emergency. Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. **It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.** The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or

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sheltering within the facility.

- E. **Supplementary Assistance:** SIU is committed to assisting students with disabilities. With the cooperation of SIU's Disability Support Services (DSS), each student who qualifies for reasonable supplementary assistance has the right to receive it. Students requesting supplementary assistance must first register with DSS in Woody Hall, B-150, 618-453-5738 or 618-453-2293 (TTY), by email DSS@siu.edu, or <http://disabilityservices.siu.edu/>. Notice: If you have any type of special need(s) or disability for which you require accommodations to promote your learning in class, please contact me as soon as possible. The Office of Disability Support Services (DSS) offers various support services and can help you with special accommodations. You may wish to contact DSS to verify your eligibility and options for accommodations related to your special need(s) or disability.

Student Services

- A. **Learning Support Services:** The Center for Learning Support Services (CLSS) assists students of all cultures, abilities, backgrounds and identities with enhancing their self-management and interdependent learning skills. Programs offered by CLSS include: group study sessions; math tutoring; academic coaching; early intervention program; and study skills seminars. For additional information please contact CLSS in Woody Hall, Room A-313, 618-453-2925, or www.tutoring.siu.edu.
- B. **Writing Center:** The Writing Center offers free tutoring services and assistance with improving writing skills to all SIU undergraduate students and faculty. For center locations and hours, to schedule an appointment online, and to view information regarding the Online Writing Lab (OWL) contact the Writing Center at 618-453-1231 (Morris Library location); 618-453-2927 (Trueblood location), or www.write.siu.edu.
- C. **Saluki Cares:** The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress-physical, emotional, financial or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. To make a referral to Saluki Cares click, call or send: <http://salukicare.siu.edu/index.html>; 618-453-5714, or siucares@siu.edu.