

COURSE NUMBER: Ve312		COURSE TITLE: Digital Integrated Circuits	
CREDIT: 4		PREREQUISITES: Ve216	
TEXTBOOKS/REQUIRED MATERIAL: “Digital Integrated Circuits,” 2 th ed, by Jan M. Rabaey, Anantha Chandarkasan, and Borivoje Nikolic		INSTRUCTOR: Yaping Dan DATE OF PREPARATION: Oct. 30, 2012 DATE OF UC APPROVAL: Oct. 30, 2013	
INSTRUCTOR(S): Yaping Dan		SCIENCE/DESIGN: n/a	
CATALOG DESCRIPTION: Design and analysis of static CMOS inverters and complex combinational logic gates. Dynamic logic families, pass-transistor logic, ratioed logic families. Memories; SRAM, DRAM, EEPROM, PLA. Design project(s). Lecture, recitation and software labs.		COURSE TOPICS: 1. History of Integrated Circuits (1.5 hrs) 2. Principle of PN junctions (1.5hrs) 3. Introduction to CMOS devices (4 hrs) 4. CMOS inverters (6 hrs) 5. Combinational logic gates (6 hrs) 6. Dynamic logic families (4 hrs) 7. Memories (3 hrs) 8. Project design of an Application Specific Integrated Circuit (10 hrs)	
COURSE STRUCTURE/SCHEDULE: Lecture: twice per week, 90 minutes each;			
COURSE OBJECTIVES [Course Outcomes in brackets]	<ol style="list-style-type: none"> To provide a basic knowledge of CMOS devices [1] To provide the operational principles of digital integrated circuits. [2] To provide the design skills of COMS digital integrated circuits. [2,3] To provide a hands-on experience of deigning application specific integrated circuits [4, 5, 6] 		
COURSE OUTCOMES [Program Outcomes in brackets]	<p>After completing VE420, students should be able to:</p> <ol style="list-style-type: none"> Comprehend the fundamentals of CMOS transistors. [a, e] Understand the operational and designing principles of digital integrated circuits. [a, e] Grasp the design skills of CMOS digital integrated circuits. [b, c, e, k, i] Use the commercial design tool to do simulations of digital integrated circuits. [b, c, d, e, f, k] Use the commercial design tool to draw layouts of digital integrated circuits. [b, c, d, e, f, k] Write a technical report on design and simulation of digital circuit design. [d, e, f, g, f,] 		
ASSESSMENT TOOLS [Course Outcomes in brackets]	<p>Homework [1,2, 3, 4, 5] Midterm Exam [1,2,3,4,5] Final Exam [1, 2, 3, 4,5] Written reports [6]</p>		