

Faculty of Engineering & Technology

VLSI Design

Information	:						
Course Coo	le: ELE 562	Level	:	Undergraduate	Course Hours :	3.00- Hours	
Department : Specialization of Electronics & Communication							
Area Of Stu	<u>dy :</u>						
By the end of this course, students will be able to: ÁDevelop studentsaknowledge about the analysis of CMOS Digital Circuits. Ænrich studentsaknowledge about VLSI technology. ÁDevelop studentsaknowledge about fundamentals of static and dynamic memory circuits. Árrain studentsako use software tools using the Electronic Design Automation (EDA).							
Description	<u>:</u>						
Introduction to VLSI systems, Review of digital systems, CMOS logic and fabrication, MOS transistor theory, Layout design rules, Circuit characterization and performance estimation, Circuit simulation, Combinational and sequential circuit design, Static and dynamic CMOS gates, Memory system design, Design methodology and tools.							
Course out	comes :						
a.Knowledg	e and Understanding: :						
1 -	a1- Illustrate methods of fabrication of Integrated circuits and CMOS digital applications.d CMOS digital applications.						
2 -	a2- List different styles of logic circuits.						
3 -	a3- Estimate noise-margin, switching speed and power dissipation.						
4 -	a4- Recognize static and dynamic implementation of CMOS digital circuits.						
b.Intellectual Skills: :							
1 -	b1- Analyse the voltage transfer characteristics and transient characteristics of the basic CMOS inverter.						
2 -	b2- Compare between different logic styles.						
3 -	b3- Evaluate performance of digital circuits.						
c.Professional and Practical Skills: :							
1 -	c1. Apply theories and techniques of mathematics, basic electricity and electronics to solve electronic circuit problem.						

2 - c2. Seek the components and requirements for designing a complete application circuit.

3 - c3. Use computational facilities and related software tools to design digital circuits.

d.General and Transferable Skills: :

1 -	d1. Collaborate effectively within multidisciplinary team
2 -	d2. Communicate effectively.
3 -	d3. Effectively manage tasks, time, and resources.



4 - d4. Search for information and engage in life-long self-learning discipline.

Course Topic And Contents :					
Торіс	No. of hours	Lecture	Tutorial / Practical		
Definitions and Terminologies State-of-the art of CMOS Technology	5	3	2		
Design Rules, MOSFET Model, MOSFET Characteristics, Design methodology and tools	5	3	2		
Static Behaviour of CMOS Inverter	5	3	2		
Dynamic Behaviour of CMOS Inverter	10	6	4		
Static Combinational Circuits	5	3	2		
Designing for Speed and Low Power	5	3	2		
Dynamic Combinational Circuits	5	3	2		
Static Sequential Circuits	5	3	2		
Dynamic Sequential Circuits	5	3	2		
Design Sequential Logic Circuits using different Clocking Strategy.	10	6	4		
Semiconductor Memories and RAM Cores.	10	6	4		
Peripheral Memory Circuits.	5	3	2		

Teaching And Learning Methodologies :		
Interactive Lecturing		
Discussion		
Problem Solving		
Experiential Learning		
Cooperative Learning		
Research		
Assignment / Project		

Course Assessment :						
Methods of assessment	Relative weight %	Week No	Assess What			
Assignments	10.00					
Final exam	40.00					
In Class Quizzes	10.00					
Lab Experiment	5.00					
Mid-Term Exams	30.00					
Oral Exam	5.00					

Recommended books :



ÁRecommended book (textbook): Jan M. Rabaey; ‰igital Integrated Circuits ILÁ2nd Edition; Prentice Hall; 2003. Æssential book: Neil H.E. Weste and David Harris; "CMOS VLSI Design, A Circuits

and Systems Perspective", 3rd Edition; Pearson Addison-Wesley; 2005.