Faculty of Engineering & Technology

Electronic Systems Design

Information :

Course Code :	ELE 521	**Level** :	Undergraduate	**Course Hours :**	3.00- Hours

Department :	Specialization of Electronics & Communication

Instructor Information :

Title	Name	Office hours
Associate Professor	Hesham Nabil Mohamed Ahmed	2
Assistant Lecturer	Marwa Mohamed Zaki Mohamed Shaheen	

Area Of Study :

Develop students knowledge about the design of the programmable digital integrated circuits.
Develop students knowledge about clocking systems in digital integrated circuit design.
Develop students knowledge about CMOS Technology, Scaling, and Design Rules and Layout.

Description :

Introduction to MOS technology, Geometrical design rules and layout, Circuit characterization, Regular structure (PLA), Clocked systems (FSM), Memory, Scaling, Analog circuits layout, CMOS design project, Introduction to PLDs, CPLDs and FPGAs, Commercial available FPGAS, Design development systems, Design characterization, Design examples.

Course outcomes :

a.Knowledge and Understanding: :

1 -	Describe the basic concepts in the design of digital integrated circuit technology.
2 -	Explain the construction and design of programmable integrated circuits with their applications in electronic systems design.
3 -	Illustrate the clocking systems and the performance in digital integrated circuits and the system design.
4 -	Explain the basic of CMOS Technology, Scaling, and Design Rules and Layout.

b.Intellectual Skills: :

1 -	Analyze digital circuit issues in the level of the FPGA design.
2 -	Design development for digital applications in the level of the FPGA design.
3 -	Develop suitable design solutions for some issues of integrated circuits.

c.Professional and Practical Skills: :

1 -	Develop the design and implementation of digital VLSI using the Electronic Design Automation (EDA) tools.
2 -	Implement digital circuits using FPGA (Xilinx or Altera).
3 -	Write technical reports.

d.General and Transferable Skills: :	
1 -	Collaborate effectively within multidisciplinary team.
2 -	Communicate effectively.
3 -	Effectively manage tasks, time, and resources.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to Programmable Integrated Circuits	10	6	4
Electronic Systems Design	10	6	4
Introduction to Digital Logic Design with VHDL	10	6	4
Design and implementation using CPLDs and FPGAs	10	6	4
Circuit Characterization	10	6	4
Clocked Systems.	10	6	4
Design Development System and Characterization	10	6	4
Introduction to MOS Technology, and Scaling.			
Geometrical Design Rules and Layout of the CMOS Design			

Teaching And Learning Methodologies :

Interactive Lecturing
Discussion
Problem Solving
Experiential Learning
Assignment/Project
Cooperative Learning

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments/project	10.00		
Final Exam	40.00		
Lab Experiment	5.00		
Mid- Exam I	15.00	15	
Mid- Exam II	15.00	7	
Oral Exam	5.00		
Quizzes	10.00		

Recommended books :

a. Recommended book (Textbook): Steve Kilts, "Advanced FPGA Design Architecture, Implementation, and Optimization", John Wiley & Sons, Inc., 2007.
b. Essential book: Ian Grout, Digital Systems Design with FPGAs and CPLDs, Elsevier Ltd., 2008.
c. Essential book: N. Weste and D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective" 4th Edition, Pearson, 2010.