FUTURE UNIVERSITY IN EGYPT
جامعة المستقبل

Faculty of Engineering & Technology

Integrated VLSI Systems

Information :

Course Code :	ELE 563	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Electronics & Communication

Area Of Study :

By the end of this course, students will be able to:
Apply the operational theories of static and dynamic digital circuits based on their circuit functionality and performance;
Understand the basic principles and theory of operation of static and dynamic memory circuits;
Design, and simulate digital circuits with emphasis on the performance and chip area using the Electronic Design Automation (EDA);
Enhance the student skills in the design applications of the digital signal processing (DSP) subsystems.
Enhance the student skills in the basic principles and theory of low-voltage low-power design issues.

Description :

Integrated system design, Memory cells and systems, Logic arrays, VLSI design methodologies, Applications in digital signal and data processing systems, Low-power, low-voltage design issues.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	a5- State the strategies of digital integrated circuits using FPGAs in DSP applications.
2 -	a6- Explain the basic principles and theory of low-voltage low-power design issues.
3 -	a1- Describe basic issues in digital integrated circuit design, CMOS IC layout of complex gates and design rules.
4 -	a2- Explain optimizing timing issues in CMOS circuits.
5 -	a3- Estimate different styles of logic circuits.
6 -	a4- Illustrate the static and dynamic implementation of memory circuits.
b.Intellectual Skills: :	
1 -	b1- Investigate performance of digital logic and memory circuits based in transistor level.
2 -	b2- Compare between different digital logic and memory styles.
3 -	b3- Apply the presented digital design in the DSP applications and low-voltage low-power design.
c.Professional and Practical Skills: :	
1 -	c1. Interpret theories and techniques of digital electronics to solve digital circuit problem.
2 -	c2. Build the components and requirements for designing a complete digital circuit application.
3 -	c3. Develop the design and implementation of digital integrated circuits using software tools.

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 :

Topic	No. of hours	Lecture	Tutorial / Practical
Definitions and Terminologies of the state-of-the art of digital integrated technology.	5	3	2
Design Rules Design methodology and tools	5	3	2
Static behaviour of digital circuits	10	6	4
Dynamic behaviour of digital circuits	10	6	4
Designing for high-speed digital circuits	5	3	2
Designing for low-power digital circuits	5	3	2
Design digital circuits using different clocking strategy.	5	3	2
Semiconductor static memories and RAM Cores.	10	6	5
Peripheral memory circuits.	5	3	2
Apply DSP applications	10	6	4
Low-voltage low-power design	5	3	2

Teaching And Learning Methodologies :

Interactive Lecture
Discussion
Problem Solving
Experiential Learning
Cooperative Learning
Research
Site Visit (Field Trip)
Project / Assignment

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
ÅFinal exam	40.00		
ÅQuizzes o In Class Quizzes	10.00		
o Assignments	10.00		

o Lab Experiment	5.00		
o Mid-Term Exams	30.00		
o Oral Exam	5.00		

Course Notes :

Integrated system design, Memory cells and systems, Logic arrays, VLSI design methodologies, Applications in digital signal and data processing systems, Low-power, low-voltage design issues.

Recommended books :

Recommended book (textbook): Jan M. Rabaey; ñDigital Integrated Circuitsò, 2nd Ed.; Prentice Hall; 2003.
Essential book: Neil H.E. Weste and David Harris; "CMOS VLSI Design, A Circuits and Systems Perspective", 3rd Ed.; Pearson Addison-Wesley; 2005.