FUTURE UNIVERSITY IN EGYPT
جامعة المستقبل

Faculty of Computers & Information Technology

Logic Design

Information :

Course Code :	CS111	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Faculty of Computers & Information Technology

Area Of Study :

Apply the basic concepts of digital systems, including analysis and design.
Combine and evaluate different methods to simplify logic functions.
Analyze the requirements of combinational logic functions such as adders, multiplexers and decoders, and design a solution for these requirements.
Compare and evaluate methodologies from range of techniques to implement the combination logic functions.
Use effectively communication skills.
Understand knowledge that enhances skills in learning FPGA and HDL.

Description :

Basic logic concepts: Logic states, number systems, Boolean algebra, basic logical operations, gates and truth tables.
Combinational logic: Minimization techniques, multiplexers and de-multiplexers, encoders, decoders, adders and sub-tractors, comparators, programmable logic arrays and memories, design with MSI, logic families, tristate devices.
Sequential logic: Flip flops, mono-stable multi-vibrators, latches, registers, and counters .

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Define fundamental concepts of logic and primitive logic gates behaviors.
2 -	Explain the principles and techniques of constructing the Boolean functions and the methods to simplify those using Boolean algebra rules, and K-maps.
3 -	Describe the main types of combinational logic circuits and sequential logic circuits.
b.Intellectual Skills: :	
1 -	Analyze different problems in combinational and sequential logic circuits.
2 -	Propose a set of alternative solutions by FPGA and HDL.
3 -	Compare and differentiate between simplification of logic functions by Boolean algebra and K-Maps.
c.Professional and Practical Skills: :	
1 -	Analyze, design, and implement combinational logic circuits.
2 -	Apply, design methodologies, programming languages such as HDL, and different supporting tools for the development of combinational and sequential logic circuits.
d.General and Transferable Skills: :	
1 -	Work on a team for the development of a requirements document.
2 -	Apply communications skills in presentation and report writing of requirements engineering deliverables.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
The nature of logic circuits and number systems	4	2	2
Basic Logic Gates	4	2	2
Boolean Function: simplification using Boolean Algebra	4	2	2
Boolean Function: Simplification using K-Maps	4	2	2
Combinational Circuit Design	4	2	2
Adders, subtracts, multiplication, division circuits	4	2	2
Multiplexer, De-Multiplexer	4	2	2
Encoder, Decoder	4	2	2
Mid-Term Exam	2		
Sequential Circuits and their types	4	2	2
Latches and Flip-Flops	4	2	2
Register and Counters	4	2	2
Introduction to FPGA and HDL	4	2	2
Final Exam	2		

Teaching And Learning Methodologies :

Interactive Lectures including Discussions
Tutorials
Practical Lab Sessions
Self-Study (Project / Reading Materials / Online Material / Presentations)

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	10.00	4	
Final Exam	40.00	14	
Midterm Exam (s)	20.00	9	
Practical Exam	10.00		
Quizzes	5.00	20	

Course Notes :

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)