Faculty of Engineering & Technology

Digital Systems

Information :

Course Code :	ELE 366	**Level** :	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Mechatronics Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Mohamed Ali Mohamed Elsayed Torad	6
Teaching Assistant	Donia Waheed Mohamed Abdelmonem Saleem	

Area Of Study :

˝Enrich students' knowledge of the basic understanding of logic gates and digital circuits.
˝Make the student gain the ability to build mechatronics solutions using digital system components such as MUXs, Decoders, PLAs, Counters, etc.
˝Train the student to analyze, minimize and synthesize combinational and synchronous sequential logic circuits via applying hardware and software skills through mini design projects.

Description :

Number systems; Codes and coding; Logic gates; Minimization techniques applied to design of logic systems; Combinational circuits; Latches, flip-flops, registers and counters; Synchronous sequential circuit design; State machines; Memory and I/O logic elements; Discussion of microprocessors; Analog/digital and digital/analog converters.

Course outcomes :

a.Knowledge and Understanding: :

1 -	Identify basic applied and engineering science related to digital systems.
2 -	Identify principles of digital logic design and its implementation in various fields of mechanical engineering and some other engineering disciplines.
3 -	Label the logic gates (e.g. AND, OR, NOT, XOR, XNOR, NAND, NOR).
4 -	List the Boolean algebra expressions.
5 -	Associate the minimization techniques applied to design of logic systems
6 -	Identify the memory types (i.e. capabilities of each memory type . memory mapping)
7 -	Explain microprocessor principles and its main components

b.Intellectual Skills: :

1 -	Solve digital circuit and logical design problems in mechanical engineering.
2 -	Evaluate designs, processes, and performance of digital systems.
3 -	Apply latches and flip-flops to design systems solving problems at the mechanical engineering.
4 -	Adapt Synchronous sequential circuit design, State machines into mechanical engineering applications.

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5 -	Apply combinational circuits to design applications which fulfill specific mechanical engineering applications (e.g. counters).	

c.Professional and Practical Skills: :

1 -	Prepare technical report considering results of lab experiments.
2 -	Apply gained design skills to solve applications in mechanical and mechatronics applications.

d.General and Transferable Skills: :

1 -	Collaborate effectively within multidisciplinary team
2 -	Search for information in different sources.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Digital Systems and Binary Numbers	4	2	2
Boolean Algebra and Logic Gates	7	3	4
Simplification of Boolean Functions: The Karnaugh Map Method	8	4	4
Combinational Circuits	8	4	4
Latches and Flip-Flops	4	2	2
Synchronous Sequential Devices	6	4	2
Registers and Counters	8	4	4
Memory and Programmable Logic	7	3	4
Design Project Presentation	8	4	4

Teaching And Learning Methodologies :

Interactive Lecturing
Problem solving
Discussion
Experiential learning
Project
Research

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final Exam	40.00		
First Midterm	15.00	6	
Participation Assessments	10.00		
Project	20.00	14	
Second Midterm	15.00	11	

Course Notes :

http://www.fue.edu.eg

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1. Lecture notes
2. Handouts.

Recommended books :

Recommended Readings:
C.H. Roth, Jr. and L.L. Kinney, Fundamentals of Logic Design, Cen-gage Learning, Stamford CT, USA, 2014.