

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
Professor	Medhat Hussein Ahmed Awadalla	
Teaching Assistant	Seham Hassan Mohammed Rehan	

Area Of Study :

By the end of the course the students will be able to:

- 1) Demonstrate knowledge of the basic understanding of logic gates and digital circuits.
- 2) Gain the ability to build mechatronics solutions using digital system components such as MUXs, Decoders, PLAs, Counters, etc.
- 3) Demonstrate the ability 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: :

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| 1 - | a1. Identify basic applied and engineering science. |
| 2 - | a2. Apply principles of digital logic and its implementation in various |

b. Intellectual Skills: :

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| 1 - | b1. Define digital circuit and logical design problems in mechanical engineering |
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c. Professional and Practical Skills: :

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| 1 - | c1. Design combinational circuits using digital logic circuits. |
| 2 - | c2. Apply gained design skills to solve applications in mechanical and |

d. General and Transferable Skills: :

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| 1 - | d1. Collaborate effectively within multidisciplinary team |
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Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Digital Systems and Binary Numbers		2	2
Boolean Algebra and Logic Gates		3	3
Simplification of Boolean Functions: The Karnaugh Map Method		4	4
Combinational Circuits		4	4
Latches and Flip-Flops		2	2
Synchronous Sequential Devices		4	4
Registers and Counters		4	4
Memory and Programmable Logic		3	3
Design Project Presentation		4	2
Midterm Tests		0	2

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	20.00	6	
Participation and Assessments	10.00		
Project	10.00	14	
Second Midterm	20.00	11	

Course Notes :

Lecture notes and videos on the course Moodle page, FUE website.

Recommended books :

Jr.C.H. Roth and L.L. Kinney, Fundamentals of Logic Design, Brooks Cole, 2010.