

**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 :**

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 :**

<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
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 :**

<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
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.