

# Faculty of Engineering & Technology Digital Systems

#### Information:

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

**Department:** Specialization of Mechatronics Engineering

<u>Instructor Information :</u>					
Title	Name	Office hours			
Professor	Medhat Hussein Ahmed Awadalla				
Teaching Assistant	Seham Hassan Mohammed Rehan				

#### Area Of Study:

Bytheendofthecoursethestudentswillbeableto:

- 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 out	tcomes :			
a.Knowledge and Understanding: :				
1 -	a1. Identify basic applied and engineering science.			
2 -	a2. Apply principles of digital logic and its implementation in various			
b.Intellectu	ial Skills: :			
1 -	b1. Define digital circuit and logical design problems in mechanical engineering			
c.Professio	onal and Practical Skills: :			
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: :				
1 -	d1. Collaborate effectively within multidisciplinary team			



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.