

## Faculty of Engineering & Technology

### Logical Design and Digital Circuits

#### Information :

**Course Code :** ELE 215

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Electrical Engineering

#### Instructor Information :

Title	Name	Office hours
Lecturer	Nermin Mohamed Fawzy Mahmoud Salem	10
Lecturer	Nermin Mohamed Fawzy Mahmoud Salem	10
Assistant Lecturer	SHEROUK SOBHI ABDELSALAM FOUDA	
Assistant Lecturer	SHEROUK SOBHI ABDELSALAM FOUDA	
Assistant Lecturer	Marwa Mohamed Zaki Mohamed Shaheen	
Teaching Assistant	Ahmed Mahmoud Mohamed Mahmoud Hegazy	

#### Area Of Study :

- Understand and use different number systems and coding schemes.
- Analyze and design combinational logic based on minimizing Boolean functions.
- Analyze and design flip flops and get deeply involved with sequential circuits (especially synchronous).
- Train students to perform experiments on digital circuits using software tools for circuit logic design and simulation.

#### Description :

Review on number systems: positional notation, binary number systems, number base conversion, octal and hexadecimal, negative numbers, coded number systems, Switching functions: main operators, postulates and theorems, Analysis and synthesis of switching functions, incompletely specified functions, Design using NAND and NOR gates, standard combinational Logic, PLA & PAL implementation of combinational logic, Storage devices: 1-bit storage, set-reset FF, clocked SR-FF, positive and negative-edge triggered SR-FF, JK-FF, Race-around condition, Master-slave JK-FF, D-FF, T-FF, Excitation table. Introduction to sequential circuits and FSM.

#### Course outcomes :

##### a.Knowledge and Understanding: :

1 -	Describe different number systems: positional notation, binary number systems, number base conversion, octal and hexadecimal, negative numbers, coded number systems.
2 -	Discuss switching functions: main operators, postulates and theorems.
3 -	Explain analysis and design of combinational circuits and their applications.
4 -	Explain analysis and design of sequential circuits and their applications.

##### b.Intellectual Skills: :

1 -	Solve problems related to different number systems and its different applications.
2 -	Analyze problems related to different combinational circuits and their different applications.
3 -	Analyze problems related to different sequential circuits and their different applications.

4 -	Design digital circuits using professional software tools.
<b>c. Professional and Practical Skills: :</b>	
1 -	Clarify theories and techniques of mathematics to solve digital circuit problems.
2 -	Build the components and requirements for designing a complete digital circuit.
3 -	Develop the design and implementation of digital circuits using software tools and measuring instruments.
4 -	Seek thoroughly datasheets and identify appropriate specifications for required digital circuits either combinational circuits or sequential circuits.
<b>d. General and Transferable Skills: :</b>	
1 -	Collaborate effectively within multidisciplinary team
2 -	Communicate effectively.
3 -	Effectively manage tasks, time, and resources.
4 -	Search for information and engage in life-long self-learning discipline.

#### **Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Switching functions: main operators, postulates and theorems.	10	6	4
Analysis and synthesis of switching functions	10	6	4
Number systems and coding systems	10	6	4
Analysis of Combinational circuits.	10	6	4
Design of Combinational circuits.	10	6	4
Asynchronous sequential circuits	5	3	2
Analysis of Synchronous sequential circuits.	10	6	4
Design of Synchronous sequential circuits, registers	10	6	4

#### **Teaching And Learning Methodologies :**

Interactive Lecture
Discussion
Problem Solving
Experimental Learning
Cooperative Learning
Research
Site Visit (Field Trip)
Project/Assignment

#### **Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Final exam	40.00		
Electronic and computer Lab Experiments	10.00		

o In Class Quizzes and participation	20.00		
o Mid-Term Exams	30.00		