

## Faculty of Engineering & Technology

### Introduction to Microprocessors

#### Information :

**Course Code :** ELE 410

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Specialization of Mechatronics Engineering

#### Instructor Information :

Title	Name	Office hours
Associate Professor	Mohamed Hassan Mohamed Elmahlawy	
Teaching Assistant	Shahd Ahmad Samir Ibrahim	

#### Area Of Study :

Upon completing this course the student will have learned, the following:-

- The characteristics of a microprocessors, and its applications.
- The relationship between hardware and software and how they work together to accomplish a task.
- Identify the major component of a microcontroller-based systems, describe the steps involving in assembling, linking, and executing a program.
- Write programs in assembly and C languages to perform given tasks and run them.

#### Description :

Microprocessor system design; 8051 architecture and organization; Instruction set; Addressing modes; stack and branching; Interrupts and exceptions; Microprocessor support circuits and peripheral interfacing; Assembly programming; C language programming; Applications include data collection and control of pneumatic, hydraulic and machine systems.

#### Course outcomes :

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

1 -	Outline current and underlying technologies that support computer processing and inter-computer communication.
2 -	Identify and demonstrate usage of tools, practices and methodologies used in the specification, design implementation and critical evaluation of computer software systems.
3 -	Discuss issues of reliability
4 -	Outline fundamentals in computing, including hardware and operating systems.
5 -	List the main syntax of assembly and C languages.
6 -	Discuss issues about the microprocessor performance.

##### **b. Intellectual Skills: :**

1 -	Modify microprocessor programs written in assembly or C languages to upgrade a given process.
2 -	Debug microprocessor programs written in assembly or C languages to perform a given task.
3 -	Design microprocessor programs in assembly and C languages to perform a given task.

**c. Professional and Practical Skills: :**

1 -	Operate computing equipment efficiently, taking into account its logical and physical properties.
2 -	Identify risks or safety aspects that may be involved in the operation of computing equipment within a given context.
3 -	Use the assembly language to write drivers for different computer accessories.
4 -	Use the assembly language to control the different computer units.
5 -	Implement programs using the assembly and C languages.

**d. General and Transferable Skills: :**

1 -	Work in stressful environment and within constraints.
2 -	Demonstrate efficient IT capabilities.
3 -	Manage tasks and resources.
4 -	Communicate effectively.
5 -	Manage one's own learning and development, including time management and organizational skills.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to microprocessors and embedded processors.	4	2	2
The 8051 microcontroller overview and programming model and architecture.	8	4	4
The 8051 Assembly language programming and addressing modes.	12	6	6
Arithmetic, logical, and jump instructions.	8	4	4
I/O parallel port programming.	8	4	4
The 8051 C programming.	8	4	4
Timer, serial port, and interrupt programming in Assembly and C.	8	4	4
Design projects.	6	4	2

**Teaching And Learning Methodologies :**

Interactive Lecturing  
Discussion  
Experiential learning  
Project  
Research

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Final Written Exam	40.00	16	
First Assignments, Participation, & Quizzes	15.00		
First Midterm Exam	15.00	6	
Second Assignments, Participation, & Quizzes	15.00		

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Second Midterm Exam	15.00	11	
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