

**Faculty of Engineering & Technology**  
**Programmable Logic Controllers(PLCS)**

**Information :**

**Course Code :** MKT 440

**Level :** Undergraduate

**Course Hours :** 2.00- Hours

**Department :** Specialization of Mechatronics Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	Abdel Moneim Mohamed El Mahdi Ismail	2
Teaching Assistant	Osama Ahmed Ibrahim Mohamed Montaser	1
Teaching Assistant	Fady Ayman Mohamed Naguib Mahmoud Noah	

**Area Of Study :**

This course aims to:

- Introduce the Programmable logic controllers (PLCs) as an industrial option for a microprocessor based control unit.
- Introduce the necessary hardware and software for editing debugging, and executing a PLC control program.
- Train students to design, build, and test a PLC program code for controlling an automated system.

**Description :**

Basic Programmable logic controllers (PLCs) functions and programming; Relay and ladder logic; PLC programming and interfacing; PLC installation practices and troubleshooting techniques; Strategies to identify and localize PLC hardware generated problems; PLC Safety Procedures; PLCs in mechatronics systems; Mini design projects.

**Course outcomes :**

**a.Knowledge and Understanding: :**

- |     |   |
|-----|---|
| 1 - | a1. Describe the function of the main parts of a typical PLC.   |
| 2 - | a2. Describe the different types of PLC peripherals.  |
| 3 - | a3. Interpret the basic PLC programming instructions.   |
| 4 - | a4. Describe the main steps for commissioning, maintenance, and troubleshooting of a PLC controlled system. |

**b.Intellectual Skills: :**

- |     |  |
|-----|--|
| 1 - | b1. Develop PLC programs based on logic gate functions.                                |
| 2 - | b2. Convert relay ladder schematics to ladder logic programs.                          |
| 3 - | b3. Develop PLC programs directly from a narrative description.                        |
| 4 - | b4. Apply combinations of counters and timers to PLC programs.                         |
| 5 - | b5. Create PLC programs involving data manipulations, math and sequencer instructions. |

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

- |     |   |
|-----|---|
| 1 - | c1. Install the PLC editor Software to a specific PC.                     |
| 2 - | c2. Apply safety rules in preparing and execution of PLC control systems. |

3 -	c3. Download the designed ladder logic program to the corresponding
4 -	c4. Present the results of Experiments of control using PLC.
<b>d.General and Transferable Skills: :</b>	
1 -	d1. Work in stressful environment and within constrain.
2 -	d2. Communicate effectively.
3 -	d3. Effectively manage tasks, time, and resources.
4 -	d4. Search for information and engage in life-long self-learning discipline

<b>Course Topic And Contents :</b>			
<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
Introduction		2	0
PLC H.W. components		2	0
Basics of PLC Programming		2	0
Programming Timers		5	0
Programming Counters		5	0
Programming Control Instruction		3	1
Data Manipulation Instructions.		3	0
Math Instructions		2	0
Sequencer & Shift register Instruction		3	0
PLC Commissioning, maintenance, & Trouble shooting.		3	0
Labs- Project work.		0	15

<b>Teaching And Learning Methodologies :</b>
Interactive Lecturing
Problem solving
Discussion
Experiential learning
Project
Research

<b>Course Assessment :</b>			
<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
Assignments, Participation, & Quizzes	20.00	12	
FinalWrittenExam	40.00		
First MidTerm Exam	15.00	6	
Project	10.00	12	
Second Midterm Exam	15.00	9	

**Recommended books :**

Bolton, William; Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, Prentice Hall, 4th Edition, 2008