



BENHA UNIVERSITY



FACULTY OF ENGINEERING AT SHOUBRA

COURSE SPECIFICATIONS (2014-2015)

Model No.12

Course Specifications: Programmable Logic Controller

University: Benha University

Faculty: Faculty of Engineering at Shoubra

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

1- Course Data

Course Code: MDP443

Course Title: Programmable Logic Controller

Specialization: production Mechanical Engineering department

Course Type: Elective

Study Year: Fourth Year

Teaching Hours: Lecture: 3

Tutorial: 2

Practical: 0

Total: 5

2- Course Aim

For students undertaking this course, the aims are to:

1. Put technical specification and data sheet of PLCs
2. Analyze any logic problems and write the logic equations
3. Convert the logic equation into ladder diagrams, Statement list or function block
4. Write PLC ladder program which include Logic, timers, counters and mathematical.
- 5.

3- Intended Learning Outcomes of Course (ILO's)

a. Knowledge and Understanding Skills: On completing this course, students will acquire knowledge and understanding of:

- a.1) Terminologies used in engineering related to PLC. (A.17).
- a.2) The basic principles of the PLC, Input devices, Output devices and actuators, and PLC logic. (A19)
- a.3) The automation sequences provided by the PLC to enhance the manufacturing. (A13)
- a.4) A PLC concepts to handle and manipulate the data from input and process it. (A19)

b. Intellectual Skills: At the end of this course, the students will be able to:

- b.1) Assess the differences between Input devices, and Output devices.(B5)
- b.2) describe the different steps to get Ladder diagram programs (B.8).
- b.3) Investigate the PLCs sensors and studies its characteristics (B.5).
- b.4) Solve engineering problems in PLC automation of manufacturing processes (B7).

c. Practical and Professional Skills: On completing this course, the students are expected to be able to:

- c.1) Create and/or re-design a process and carry out specialized PLC program for automating the process (C.2).
- c.2) write a complete PLC program using ladder diagram (C.17).
- c.3) hard wiring the PLC to their mechanical component to control it (C.17).

General and Transferable Skills: At the end of this course, the students will be able to:

- d. 1) search for the PLC components that are useful to enhance the automation process (D.7).
- d. 2) complete a report and small project to solve an engineering problem in automation using PLC (D.6).

**COURSE SPECIFICATIONS (2014-2015)****4- Course Contents**

Week no.	Topics
1	Introduction to PLC structure.
2	Input devices
3	Output devices and actuators , PLC logic
4	Ladder diagram programming
5	Ladder Programming application and case studies
6	PLCs sensors
7	PLC logic ad K map
8	Timers applications
9	counters applications
10	Master control relay application
11	Internal relays, Shift registers, Data handling
12	mathematical application of PLC process
13	Test and debugging

5- Teaching and Learning Methods

- 5.1 Lectures
- 5.2 Practical training / laboratory
- 5.3 Case study
- 5.4 Assignments / homework

6- Teaching and Learning Methods of Disables

6. Nothing.

7- Student Assessment**a- Student Assessment Methods**

1. Four Assignments to assess knowledge and intellectual skills.
2. Two quizzes to assess knowledge, intellectual and professional skills
3. Mid-term to assess knowledge, intellectual, professional and general skills.
4. Final exam to assess knowledge, intellectual, professional and general skills.
5. Reports to assess knowledge and experience gained

b- Assessment Schedule

NO.	Assessment	Week
1	Assignments	5, 7, 11, and 13
2	Quizzes	5, 10
3	Mid-term exam	8
4	Final exam	15

c- Weighting of Assessments

Assessment	Weight (%)
Mid-Term Examination	16%
Final-Term Examination	64 %
Practical Examination	10 %
Semester work	10 %
Total	100



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8- List of References

a- Course Notes: Course Power point presentation prepared by instructor.

b- Recommended Books

- Programming Logic Controllers: The Industrial Computers by Costanzo, 2009

c- Recommended Books

PLC device and Logic Controllers by Perez, Prentice Hall 2009

Course Coordinator: Prof. Dr. Saber Mahmoud Abed Rabbo Tith

Head of Department: Prof. Dr. Osama Ezzat Abdelatif



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FACULTY OF ENGINEERING AT SHOUBRA

COURSE SPECIFICATIONS (2014-2015)

Model No.11A

Course Specifications: Programmable Logic Controller PLC

University: Benha University

Faculty: Faculty of Engineering at Shoubra

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

Matrix of Knowledge and Skills of the Course						
no.	Topics	Week no.	Knowledge and Understanding Skills	Intellectual Skills	Practical and Professional Skills	General and Transferable Skills
1	Introduction to PLC structure.,	1	a1	b.1, b.4	c1	
2	Input devices	2	a.2	b.1	c.3	d1
3	Output devices and actuators , PLC logic	3		b.4	c. 3	d1
4	Ladder diagram programming	4	a.2, a.3	b.2		d.1
5	Ladder Programming application and case studies	5	a.4	b.4	c3, c.2	d1
6	PLCs sensors	6		b.1	c.2, c.1	d.1
7	PLC logic ad K map	7	a.2	b1	c.2	d.2
8	Mid-term exam	8				
9	Timers applications	9	A1,a.4		C1	d1
10	Timers applications	10			c.1, c.3	d3
11	Master control relay application	11	a.4, a.3		c1,c.2	d1
12	Internal relays, Shift registers, Data handling	12	a.1, a.3		c.2	d.3
13	mathematical application of PLC process	13	a1,a.2			d.2
14	Test and debugging	14	a.3		c2	d1
15	Final exam	15				

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COURSE SPECIFICATIONS (2014-2015)

Matrix of Course Aims and ILO's

Course Title: Programmable Logic Controller PLC

Course Code: MDP443

Teaching Hours: Lecture: 3 Tutorial: 2 Total: 5

Major or minor element of program: Major

Program on which the course is given: B.Sc. Mechanical production Engineering

Department offering the program: Mechanical Engineering Department

Academic year / level: 2014-2015 Fourth Year / First Semester

Date of specifications approval: 2014

Course aims	Basic Knowledge	Intellectual Skills	professional Skills	General Skills
1- Put technical specification and data sheet of PLCs	a1	b1	c1	d1
2- Analyze any logic problems and write the logic equations	a3,a4	b3	c2	d2
3- Convert the logic equation into ladder diagrams, Statement list or function block	a2	b2	c2	d2
4- Write PLC ladder program which include Logic, timers, counters and mathematical	a3	b1,	c3	d3

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