GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Diploma Engineering				Branch	Mechatronics Engineering		
Semester	V				Version	1.0.0.0		
Effective from Academic Year			2018-19		Effective for the batch Admitted in			July 2018
Subject code	1MC2502		Subject Name		PROGRAMMABLE LOGIC CONTROLLER			
Teaching scheme					Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	2	0	5	Theory	40	60	100
Hours	3	0	4	0	7	Practical	60	40	100

Pre-requisites:
Students must have knowledge of basic programming concepts. Students must aware with sensors and basic of digital electronics.

Course Learning Outcomes:
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes: CO1. Understand PLC and Module. CO2. Explain different types of memory. CO3. Interface Sensor to PLC. CO4. Make Ladder diagram using different PLC function. CO5. Make Ladder diagram Timer and Counter. The practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate course learning outcomes.

Course Content				
Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
UNIT – 1 INTRODUCTION	1.1 Introduction,definition & history of the PLC 1.2 Various Parts of PLC 1.3 Different types of Languages in PLC 1.4 PLC advantage & disadvantage 1.5 PLC versus Computers 1.6 PLC Application.	1a. Know the PLC. 1b. Describe the application, advantage and disadvantage of PLC.	06	04

UNIT – 2 PLC MEMORY and Boolean Logic	2.1 Program file memory 2.2 Data file memory 2.2.1 User Bit memory 2.2.2 Timer Counter memory 2.2.3 PLC Status bits 2.2.4 User Function control Memory 2.2.5 Integer Memory 2.2.3 Floating Memory 2.3 Rules of Boolean logic 2.4 Use of Boolean logic 2.5 Solve example by Boolean logic	2a. Explain Data file memory in PLC. 2b. Differentiate between integer and float memory 2c. Use Boolean logic to simplify logic.	10	05
UNIT – 3 Switches and Sensors	Function, Working and Application of following Switches and Sensors 3.1 Reed Switch 3.2 Optical sensor 3.3 Capacitive Sensor 3.4 Inductive Sensor 3.5 Sinking and Sourcing 3.6 Wiring difference in sinking and sourcing 3.7 Selection criteria forsensors	3a. Able to select appropriate sensor. 3b. Wire the PNP and NPN type sensor. 3c.Explain working of different type of sensors.	14	14
UNIT – 4 PLC FUNCTION	Different types of Function used in PLC 4.1 Data Handling Function 4.1.1 Move Function 4.1.2 Mathematical Function 4.1.3 Conversion Function 4.2 Logical Function 4.2.1 Comparison Function 4.2.2 Boolean Function 4.3 Stack function 4.4 Sequencer Function 4.5 Branching and Looping	4a. Identify different types of Function. 4b. Make the logic using function. 4c. Able to use proper function to build program.	18	14
UNIT – 5 Timer and Counter	Types and use of different types of Timer and Counter in PLC 5.1 Timer in PLC 5.1.1 Types of timer 5.1.2 Timer timing diagram of TON 5.1.3 Timer timing diagram of TOF 5.1.4 Timer timing diagram of Retentive timer	5a. Explain working and function of Timer and Counter. 5b. Build logic using Timer 5c. Build logic using Counter	8	04

	5.2. Counter in PLC 5.2.1 Types of counter 5.2.2 Counter Up example 5.2.3 Counter down			
Unit-6 Selecting PLC	6.1 Analog Input – Output Module. 6.2 Discrete Input – Output Module. 6.3 PLC selection criteria. 5.4 PLC specifications	6a.State the criteria for selection of PLC 6b.Select right PLC for a given application. 6c.Prepare the specifications of a PLC	4	4

List of Practical		
No.	Unit	
1	1,6	Getting familiar with PLC software
2	1	Bit logic instruction.
3		Sequencer.
4	5.	Different types of Timer in PLC.
5	5.	Different types of Counter in PLC.
6	4.	Program control instruction.
7	4.	Maths instruction.
8	2.	Develop ladder diagram for AND, OR, XOR, NAND, NOR and NOT.
9	5.	Develop program using TON and TOF timer
10	5.	Develop program using Counter.
11	3,4,5	Develop program using program control instruction.
12	3,4,5	Develop program using Math instruction

List of Instruments/Equipment/Trainer Board	
1	Trainer kit of PLC
2	Different types of Sensor
3	Power Supply for PLC
4	Different Module.

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1.	Programmable Logic Controller,5th Edition	John W. Webb and Ronald A. Reis	PHI Learning, New Delhi
2.	Programming Language Concept	Peter sestoft	Springer
3.	Automating Manufacturing System	Hugh Jack	Mc. Graw Hill, New Delhi
4.	A practical Handbook to PLC	Alireza H. FassihMc. Graw Hill	New Generation publication
5.	Programmable Logic Controllers,5th Edition	W. Bolton	Newnes

List of Software/Learning Websites

i. www.plcs.net
ii. www.automation.siemens.com
iii. www.abb.co.in
iv. www.ia.omron.com