

Branch Name:	Electrical Engineering
Program Code	ET403
Course Name:	MICROPROCESSOR AND CONTROLLER APPLICATIONS
Course Code:	2ET4030603
Pre-requisite Course:	

COURSE OBJECTIVE:

The course content should be taught and implemented with an aim to develop different skills

1. Distinguish Micro processors, microcontrollers and PLC based control systems
2. Understanding of microprocessor.
3. Maintain microcontroller-based systems.
4. Maintain PLC-based systems.
5. Maintain SCADA-based systems.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	4	60	40	20	30	150

DETAILS OF COURSE CONTENTS:

Sr No	Topics and Sub-topics	Total Hours	% Weightage
1	Control Systems Components 1.1 Role of control system in instrumentation 1.2 Open and close loop control system, types and Block diagram 1.3 Servomechanism and regulators with suitable examples 1.4 Basic control actions - On-off, Proportional, Derivative, Integral control, Proportional derivative (PD), Proportional integral (PI), P Proportional integral and Derivative (PID) control 1.5 Basic control system components –AC/ DC Servo motor,	8	20

	AC/ DC Techo generator, Stepper motor and Synchro		
2	Basics of Microprocessor 2.1 Introduction to microprocessor 2.2 Advantages and disadvantages of microprocessor control 2.3 Structure of micro processor, Generalized architecture of microprocessor, Functions of each block 2.4 Functional block diagram of 8085 microprocessor with pin diagram, logical block diagram of 8085 microprocessor, Instruction Cycle, Machine Cycles, T-States 2.5 Assembly language Programming of 8085, Addressing Modes, Instruction classification, Instruction formats 2.6 Basic Assembly Language programming (only simple arithmetic operations-addition, subtraction) 2.8 Advanced Microprocessors : Overview of 8086,80286/80386	10	25
3	Basics of Microcontroller 8051 3.1 Microcontrollers and microprocessors 3.2 Pin diagram of 8051 microcontroller 3.3 Internal RAM, ROM and Special function Registers in 8051chip 3.4 I/O ports 3.5 Counters and Timers 3.6 Memory address decoding 3.7 Interfacing 8031/8051 with ROM/EPROM and Data ROM	10	25
4	Microprocessor and Microcontroller Applications 4.1 Different types of memories: ROM, RAM, PROM, EPROM, EEPROM 4.2 Schematic diagram of memory chips decoder, memory interfacing. 4.3 Memory I/O data transfer scheme for 8255. 4.4 Interfacing of switches and LEDs 4.5 Simple applications of microprocessor and Microcontroller for temperature control of furnace, Traffic light control and SCR firing angle control using micro processor, 4.6 Data acquisition system.	10	20
5	Programmable Logic Controller And SCADA 5.1 PLC:CPU, I/O modules, bus system, power supplies and remote I/Os, counter, timer 5.2 Different PLC's available in market 5.3 Selection of a PLC 5.4 SCADA- Concept and Application	04	10

LIST OF REFERENCES:

1. Microprocessor Architecture, Programming and Applications with 8085

- Gaonkar, Ramesh S.
2. Microprocessors and Interfacing Programming and Hardware
Hall, Douglass V.
3. Control Systems Engineering, Nagarath I. J. Gopal M.
4. www.allaboutcircuits.com
5. www.nmbtc.com

LIST OF PRACTICAL:

SR NO	PRACTICALS/EXPERIMENTS
1	To Control Angular Displacement Using Synchro
2	To study the speed control of DC motor using techo-generator
3	Develop/Execute a programmed for addition
4	Develop/Execute a programmed for subtraction
5	Organization of 8085 Microprocessor.
6	Interfacing of seven segment display with 8051.
7	Control speed of Stepper Motor using 8051.
8	Interface programmable device 8255 with microprocessor 8085.
9	Control Temperature Using 8085.
10	Control firing angle of SCR using 8085.
11	Control Traffic light system using 8085.
12	To study about Programmable Logic Controller.

COURSE OUTCOME:

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:

1. Discuss microprocessor-based systems.
2. Discuss microcontroller-based systems.
3. Illustrate PLC-based systems.
4. Explain SCADA-based systems..
5. Interpret the salient features of architype of types microcontrollers IC 8051
6. interface 8051 microcontrollers with LED/SWITCH

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Thorough understanding of microprocessors and microcontrollers: architecture, operations, and distinctions	1 Remembering 2 Understanding
CLO2	Ability to understanding the instruction set architecture (ISA) and addressing modes, assembly language programs for microprocessors and microcontrollers IC 8051	1 Remembering 2 Understanding
CLO3	Understanding memory organization and input/output operations, including memory mapping and I/O port addressing.	1 Remembering 2 Understanding
CLO4	Able to understand the fundamental concepts of SCADA, including its role in industrial automation and control systems.	1 Remembering 2 Understanding
CLO5	Able to understanding the basic components of a PLC system, including input and output devices, CPU, memory, and communication interfaces.	5,3, 4 Evaluate Applying Analyze
CLO6	Apply knowledge for hands-on projects designing microcontroller systems in specific applications.	2 Applying 3 Analyze

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	H				M			L		L			H	L	L
CLO2	L				M								H	M	L
CLO3	L										L		L		L
CLO4				L	L			L						M	M
CLO5		M			L							M	M		
CLO6													L	L	

H: High, M: Medium, L: Low