

Department of Electrical and Electronics Engineering

VALUE ADDED COURSE ON

Integrated Embedded Systems, Automation and Electrical CAD Design

06-07-26 to 10-07-26

Duration: 5 Days (40 Hours)

Class : III Year - EEE

Course Objectives

The course aims to:

- Introduce students to Embedded Systems and IoT applications.
- Develop programming skills using Embedded C.
- Familiarize students with Arduino UNO, PIC Microcontrollers and hardware peripherals.
- Provide hands-on experience in PLC programming and industrial automation.
- Train students in Electrical CAD tools for schematic and panel design.

S.No	Day	Topics to Cover	Faculty Incharge
1	06-07-26 (FN & AN)	Fundamentals of Embedded Systems and Embedded C Introduction to Embedded Systems Embedded System Architecture Microcontroller vs Microprocessor Embedded System Applications Embedded Software Development Cycle Basics of Embedded C Programming Data Types, Operators and Control Structures Functions and Arrays Introduction to IDEs and Compilation Process Hands-on Session Writing basic Embedded C programs LED blinking and GPIO control concepts	Dr.R.Ganesan,AP/EEE Mr.T.Hariprasath, AP/EEE Mrs.J.Uma Maheswari, AP/EEE
2	07-07-26 (FN & AN)	IoT Development Using Arduino UNO and PIC Microcontroller Introduction to IoT and Smart Devices Arduino UNO Architecture PIC Microcontroller Fundamentals Digital and Analog I/O Sensors and Actuators Interfacing Serial Communication (UART) ADC and PWM Concepts IoT Communication Protocols Wi-Fi Bluetooth MQTT Overview	Dr.R.Ganesan,AP/EEE Mr.T.Hariprasath, AP/EEE Mrs.J.Uma Maheswari, AP/EEE

		STEM-Based Embedded Project Hands-on Session Sensor interfacing with Arduino UNO Temperature/Light Monitoring System Mini IoT Demonstration Project Presentation	
3	08-07-26 (FN & AN)	PLC Programming Fundamentals Introduction to Industrial Automation Evolution of Automation Systems PLC Architecture and Components PLC Hardware Configuration Input and Output Modules Sensors and Actuators in Automation Ladder Logic Programming PLC Addressing Concepts Timers and Counters Hands-on Session Basic PLC Programming Motor Start-Stop Control Traffic Light Automation	Mr.S.Ramesh Prabhu, AP/Gen Engg Ms.S.Kavitha, AP/Gen Engg
4	09-07-26 (FN)	Industrial Automation Applications Advanced PLC Programming Sequential Control Systems Interlocking and Safety Logic Introduction to SCADA Systems Human Machine Interface (HMI) Variable Frequency Drives (VFD) Industrial Communication Networks 1.) Modbus 2.) Profibus 3.) Ethernet/IP Industry 4.0 and Smart Manufacturing Hands-on Session PLC-Based Industrial Process Simulation HMI Screen Development Conveyor Automation Demonstration Project Presentation	Mr.S.Ramesh Prabhu, AP/Gen Engg Ms.S.Kavitha, AP/Gen Engg
5	09-07-26 (AN) To 10-07-26 (FN)	Electrical Design using AutoCAD Electrical and KiCad Introduction to Electrical CAD Tools Electrical Drawing Standards Single Line Diagrams (SLD) Control and Power Circuit Design Panel Layout Design Cable Scheduling and Component Tagging Introduction to KiCad Schematic Capture PCB Design Fundamentals PCB Routing Concepts Design Documentation and BOM Generation	Dr.S.Muthu Natarajan, AP/Gen Engg

		Hands-on Session Drawing an Electrical Control Circuit Designing a Basic PCB in KiCad Generating Design Reports	
6	10-07-26 (AN)	Internal Assessment, Project Demo & Valedictory	Mr.S.Ramesh Prabhu, AP/Gen Engg

Software/Hardware Required

- Arduino UNO Kits
- PIC Development Board
- PLC Training Kit (Siemens/Delta/Allen Bradley)
- SCADA/HMI Software
- AutoCAD Electrical
- KiCad PCB Design Suite

Course Outcomes

Upon successful completion, participants will be able to:

1. Develop basic applications using Embedded C, Arduino UNO, and PIC microcontrollers.
2. Interface sensors and peripherals for IoT applications.
3. Design and implement PLC-based industrial automation programs.
4. Understand SCADA, HMI, and industrial communication systems.
5. Create electrical schematics and basic PCB layouts using AutoCAD Electrical and KiCad.

CO – PO Mapping:

Course Name	CO. No.	POs & PSOs													
		1	2	3	4	5	6	7	8	9	10	11	1	2	
Value Added Course	CO1	H	M	M	-	L	M	-	-	H	M	H	H	M	
	CO2	H	H	M	-	M	L	-	M	M	H	H	H	H	
	CO3	H	H	M	M	M	M	-	-	H	M	M	H	M	
	CO4	H	M	L	-	L	L	-	M	M	H	H	M	M	
	CO5	H	M	L	-	M	M	-	M	M	H	M	M	M	

SDG Mapped: SDG 4, SDG 8, SDG 9, SDG 16


 VAG Coordinator
 S. RAMESH PRABHU


 HoD/EEE