

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Industry Certified Value Added Course

on

“Embedded IoT Framework for Industry 4.0 Smart Infrastructure”

08.06.2026 to 13.06.2026

50 HOURS

Objectives

- To understand the overview of architecture in IoT.
- To gain knowledge about Building IoT With ESP 32 and ESP8266 .
- To identify the various protocols used in IoT applications.
- To acquire knowledge about IoT application with cloud.
- To learn about Data base integration and data storage

UNIT I Introduction to Embedded Systems & IoT

10 Hours

Introduction to Embedded systems- Introduction to IoT technology and applications-Over view of IoT architecture and protocols- Setting up development environment and tools for IoT- Arduino environment setup- Basic programming concepts for IoT devices

UNIT II ESP 32 and ESP8266 Programming

10 Hours

Introduction to ESP32- ESP32 Pin Configuration- ESP32 Features and Memory Architecture- Wi-Fi and Bluetooth Connectivity- Power Modes in ESP32- Introduction to ESP8266- ESP8266 Architecture and Features- ESP32 vs ESP8266 Comparison- GPIO Programming- PWM, ADC, and Digital Communication

UNIT III Embedded Communication Protocols & IoT Simulation

10 Hours

Detailed Study of UART Communication- SPI Communication Protocol- I2C Communication Protocol- Sensor Communication Techniques- Real-Time Data Transfer Concepts- Introduction to Tinker cad- IoT System Design Concepts- Block Diagram Design using Draw.io.

UNIT IV MQTT Communication & Cloud Connectivity 10 Hours

Introduction to MQTT Protocol – MQTT Architecture-MQTT Topics and QoS Levels-Real Time IoT Communication-Introduction to MQTT Brokers-EMQX-Mosquitto – Python Integration with MQTT- Introduction to Twilio for IoT Alerts.

UNIT-V Data base Integration & Data storage 10 Hours

Introduction to Data bases – SQL vs NoSQL Data bases – Introduction to XAMPP – Apache and MySQL Overview-Data base and Table Creation –IoT Data logging concepts, Python MySQL Integration, Storing Sensor Data in Databases.

COURSE OUTCOMES (COs):

On successful completion of this course, the students will be able to:

CO	Course Outcome	Knowledge Level
CO1	Apply the principles of Embedded systems, IoT architecture and sensor fundamentals in IoT application development.	K3 - Apply
CO2	Build IoT Systems using ESP 32 and ESP 8266 Development kits	K3 - Apply
CO3	Identify the various communication protocols used in IoT applications	K3 - Apply
CO4	Make use of MQTT and Cloud Connectivity to develop IoT Applications	K3 - Apply
CO5	Develop a Real time IoT application for data monitoring and Storage.	K3 - Apply

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1: Professional Skills: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2: Problem - Solving Skills: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

CO - PO - PSO MAPPING

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



Trainer

Mr. M. Lourdhu Martin
Mr. S. Vetri Xavier
Mr. R. Adhiban
IoT Engineer,
SK Tech Forge,
Madurai



Course Coordinator

Mrs. T. Divya AP-CSE
Mrs. G. Rohini Priya
AP-CSE



VAC Coordinators

Mrs. S. Athilakshmi
AP-CSE
Mrs. S. Archana Devi
AP-CSE



HOD-CSE

Dr. A. Meenakshi Prof. &
HOD-CSE