

Department of Artificial Intelligence and Data Science

Industry certified Value Added Course

on

“IOT FOR AI & DATA SCIENCE : FROM SENSORS TO SMART INSIGHTS”

14-07-2025 to 19-07-2025

45 HOURS

Objectives

- To Understand IoT basics, architecture, tools, and sensor integration..
- To Explore embedded systems and program IoT devices with sensors.
- To Implement IoT communication using MQTT and visualize sensor data
- To Connect IoT devices to cloud platforms for data visualization and analytics..
- To Build and present an end-to-end IoT solution with real-time data.

UNIT I Introduction to IoT

9 Hours

Understand the fundamentals of IoT and its applications-Introduction to IoT: Definition and importance-Real world IoT applications: Smart homes, healthcare, agriculture, etc.-IoT architecture: Sensors, actuators, communication, and cloud-Tools Overview: Arduino, Raspberry Pi, and IoT platforms-Set up the Arduino or Raspberry Pi environment-Connect a basic sensor (e.g., temperature or light sensor) and read data.

UNIT II Embedded Systems Basics

9 Hours

Learn how embedded systems are fundamental to IoT-Introduction to embedded systems and microcontrollers-Understanding GPIO pins and communication protocols (I2C, SPI, UART)-Programming languages for IoT (C, Python)-Write and upload simple programs to Arduino/Raspberry Pi (LED blinking, button press detection)-Use sensors to capture data and display it on a serial monitor

UNIT III IoT Communication Protocols

9 Hours

Understand and implement communication between IoT devices.-Key protocols: MQTT, HTTP, CoAP, LoRaWAN-Introduction to MQTT: Publisher, subscriber, and broker model Setting up an MQTT broker (e.g., Mosquitto)-Set up an MQTT broker (locally or on a cloud service)-Send sensor data from Arduino/Raspberry Pi to the broker using MQTT-Visualize data using dashboards (e.g., Node-RED or ThingSpeak)

UNIT IV IoT Cloud Platforms

9 Hours

Learn to store, process, and visualize IoT data on cloud platforms-Overview of IoT cloud platforms (AWS IoT, Azure IoT, Google Cloud IoT, ThingSpeak)-Importance of data analytics and visualization in IoT-Security considerations in IoT (encryption, authentication)-Create an account on ThingSpeak or another platform-Connect an IoT device to the cloud and send sensor data for visualization-Perform basic analytics (e.g., create alerts for threshold breaches)

UNIT-V Mini Project and Future Trends

9 Hours

Apply knowledge to build an end-to-end IoT solution.-Work on mini-projects:-Smart home temperature monitoring system-IoT-based plant watering system-Real-time air quality monitoring device-Guidance and troubleshooting during project development-Students present their projects, explaining their design, code, and outcomes-Discussion on future trends in IoT: Edge computing, 5G, AI integration-Career guidance: How to pursue IoT as a career

Q&A session

COURSE OUTCOMES (COs):

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

CO	Course Outcome	Knowledge Level
CO1	Introduction to IoT	K2
CO2	Embedded Systems Basics	K3
CO3	IoT Communication Protocols	K4
CO4	IoT Cloud Platforms	K3
CO5	Mini Project and Future Trends	K6

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1 : Professional Skills: To apply learned skills to build optimized solutions pertaining to Data Processing, Artificial Intelligence and Machine Learning.

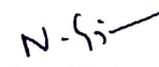
PSO2 : Problem - Solving Skills: To analyze data using domain knowledge to get insights and develop appropriate solutions.

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	M	M	M	-	L	L	M	-	M	M	L	M	M
	CO2	M	M	M	-	L	L	M	-	M	M	L	M	M
	CO3	M	M	M	-	L	L	M	-	M	M	L	M	M
	CO4	M	M	M	-	L	L	M	-	M	M	L	M	M
	CO5	M	M	M	-	L	L	M	-	M	M	L	M	M


 Course Coordinator

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 VAC Coordinators

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