21IoT17	INTERNET OF EVERYTHING	L	T	P	C
		3	0	0	3

Course Objectives

- To comprehend Characteristics and Conceptual Framework of IoT.
- To understand levels of the IoT architectures.
- To correlate the connection of smart objects and IoT access technologies.
- To Interpret edge to cloud protocols.
- To explore data analytics and data visualization on IoT Data.
- To explore IoT applications.

UNIT I	INTRODUCTION TO IOT	9 Hours

Introduction to IoT- Defining IoT, Characteristics of IoT, Conceptual Framework of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT,Brief review of applications of IoT. Smart Object – Definition, Characteristics and Trends

UNIT II	IOT ARCHITECTURE	9 Hours

Drivers Behind New Network Architectures : Scale,Security,Constrained Devices and Networks ,Data,Legacy Device Support Architecture : The IoT World Forum (IoTWF) Standardized Architecture :Layer 1-7, IT and OT Responsibilities in the IoT Reference Model,Additional IoT Reference Models A Simplified IoT Architecture

UNIT III	PRINCIPLES OF CONNECTED DEVICES AND PROTOCOLS IN IOT	9 Hours

RFID and NFC (Near-Field Communication), Bluetooth Low Energy (BLE) roles, LiFi , WPAN std : 802.15 standards: Bluetooth, IEEE 802.15.4, Zigbee, Z-wave, Narrow Band IoT, Internet Protocol and Transmission Control Protocol, 6LoWPAN, WLAN and WAN , IEEE 802.11, Long-range Communication Systems and Protocols: Cellular Connectivity-LTE, LTE-A, LoRa and LoRaWAN

UNIT IV	EDGE TO CLOUD PROTOCOL	9 Hours

HTTP, WebSocket, Platforms. HTTP - MQTT - .Complex Flows: IoT Patterns: Real-time Clients, MQTT, MQTT-SN, Constrained Application Protocol (CoAP), Streaming Text Oriented Message Protocol (STOMP), Advanced Message Queuing Protocol (AMQP), Comparison of Protocols.

UNIT V	IOT AND DATA ANALYTICS	9 Hours

Defining IoT Analytics, IoT Analytics challenges, IoT analytics for the cloud, Strategies to organize Data for IoT Analytics, Linked Analytics Data Sets, Managing Data lakes, The data retention strategy, visualization and Dashboarding-Designing visual analysis for IoT data, creating a dashboard ,creating and visualizing alerts

Course Outcomes:

At the end of the course, Students can able to

- Describe the Characteristics and Conceptual Framework of IoT
- Differentiate between the levels of the IoT architectures.
- Analyze the IoT access technologies
- Apply IoT analytics and data visualization.

Text books:

1. Arsheep Bahga (Author), Vijay Madisetti, Internet Of Things: A Hands-On Approach Paperback, Universities Press, Reprint 2020
2. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, IoT

Fundamentals Networking Technologies, Protocols, and Use Cases for the Internet of Things CISCO.

Reference Books:

1. Pethuru Raj, Anupama C. Raman, The Internet of Things: Enabling Technologies, Platforms, and Use Cases by , CRC press,
2. Raj Kamal, Internet of Things, Architecture and Design Principles, McGraw Hill Education, Reprint 2018.