21IoT12	**WIRELESS COMMUNICATION FOR IOT**	**L**	**T**	**P**	**C**
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Course Objectives

- To impart knowledge on concepts related to disaster, disaster risk reduction, disaster management
- To acquaint with the skills for planning and organizing disaster response

UNIT I	**ARCHITECTURE AND DESIGN PRINCIPLES FOR LOT**	**9 Hours**

IoT Conceptual Framework, IoT Architectural View, Technology Behind IoT, Sources of IoT,M2M communication, Examples of IoT. Modified OSI Model for the IoT/M2M Systems, data enrichment, data consolidation and device management at IoT/M2M Gateway, web communication protocols used biconnected IoT/M2M devices, Message communication protocols (CoAP-SMS, CoAP-MQ, MQTT,XMPP) for IoT/M2M devices

UNIT II	**ARCHITECTURE AND DESIGN PRINCIPLES FOR IOT**	**9 Hours**

Internet connectivity, Internet based communication,IPv4, IPv6,6LoWPAN protocol, IP Addressing in the IoT, Application layer protocols: HTTP, HTTPS,FTP, TELNET and ports.

UNIT III	**PROTOTYPING AND DESIGNING SOFTWARE FOR IOT APPLICATIONS**	**9 Hours**

Introduction, Prototyping Embedded device software, Programming Embedded Device Arduino Platform using IDE, Reading data from sensors and devices, Devices, Gateways, Internet and Web/Cloud services software development. Programming MQTT clients and MQTT server. Introduction to IoT privacy and security. Vulnerabilities, security requirements and threat analysis, IoT Security Tomography and layered attacker model.

UNIT IV	**OVERVIEW OF WIRELESS SENSOR NETWORKS**	**9 Hours**

Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks. Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture-Sensor Network Scenarios, Optimization Goals and Figures of Merit, Design principles for WSNs, Service interfaces of WSNs Gateway Concepts.

UNIT V	**COMMUNICATION PROTOCOLS**	**9 Hours**

Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Contention based protocols(CSMA,PAMAS), Schedule based protocols (LEACH, SMACS, TRAMA) Address and Name Management in WSNs, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing, Hierarchical networks by clustering.

Course Outcomes:

At the end of the course, Students can able to

- Understand choice and application of IoT & M2M communication protocols.
- Describe Cloud computing and design principles of IoT.
- Relate to MQTT clients, MQTT server and its programming.
- Descnbe the architectures and its communication protocols of WSNs.
- Identify the uplink and downlink communication protocols associated with specific

application of IOT /WSNs

Text books:

1. Raj Kamal, "Internet of Things-Architecture and design principles", McGraw Hill Education.
2. 2 Holger Karl & Andreas Willig, "Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

Reference Books:

1. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
2. 2 Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks-Technology, Protocols and Applications", John Wiley, 2007.