

Course Name: **Internet of Things**

Code: **CS578**

Pre-requisites: **None**

Credit: **3-0-0-6**

Preamble/Objectives:

Undergraduate level course on Computer Networks teaches the TCP/IP communication protocol stack and different applications for Internet. However, all the protocols in TCP/IP protocol stack are mainly designed for efficient data communication and networking. These are not suitable for resource constrained networking devices and ubiquitous networking. Therefore, a new paradigm of networking has been proposed by the development of IoT.

This course is designed to provide information about the core technologies that make up the IoT, and how they are applied in different application domains. It will help to know the components of IoT products and services including devices for sensing, actuation, processing, and protocols for data communication, networking. Finally, it will help to develop skills and experiences required to design a novel system using IoT.

Syllabus:

Introduction to IoT: What is IoT?, Impact of IoT, IoT Challenges

IoT Network Architecture & Design: oneM2M, IoTWF, Core functional stack, Data management stack

“Things” in IoT: Sensors, Actuators, Smart objects, Basics of Sensor Networks.

Communicating smart objects: Communication criteria, IoT access technologies – IEEE 802.15.4, IEEE 802.15.4e, IEEE 802.11ah, IEEE 1901.2a, NB-IoT

IoT Network Layer: IP as IoT network layer, 6LoWPAN, 6Lo, 6TiSCH, RPL

IoT Application Layer: IoT application transport methods, CoAP, MQTT

Data and Analytics for IoT: IoT Middleware, Data analytics for IoT, Big Data analytics tools and technology

IoT Application case study: Smart City, Smart Grid, Smart Transportation, Smart Manufacturing, Smart Healthcare

Text Books:

1. “IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things”, by David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry; 1st Edition, 2018, Pearson India Pvt. Ltd.
2. “Internet of Things: A Hands-on Approach”, by Arshdeep Bahga and Vijay Madiseti, 1st Edition, 2015, Universities Press (India) Pvt. Ltd.

References:

1. “21 Internet of Things (IOT) Experiments: Learn IoT, the programmer’s way”, by Yashavant Kanetkar and Shirang Korde, 1st Edition, 2018, BPB Publications.
2. Research Papers