MCAH302: INTERNET OF THINGS

Hours/Week: 4	I.A. Marks: 30
Credits: 4	Exam. Marks: 70

Course Learning Objectives: Students will try to learn,

1. Understand the concepts of Internet of Things.
2. Analyze basic protocols in wireless sensor network.
3. Design IoT applications in different domain and be able to analyze their performance.
4. Implement basic IoT applications on embedded platform.

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Course Outcomes: After completing the course, the students will be able to,

CO1: Understand the impact of IoT applications and Architectures in real world and realize the various IoT Protocols (Datalink, Network, Transport, Session, Service)

CO2: Differentiate between the levels of the IoT stack and be familiar with the key technologies

CO3: Interface different sensors to arduinouno and raspberry pi to read the environment data.

CO4: Appreciate the role of big data, cloud computing and data analytics in a typical IoT system

CO5: To provide an overview on the ICT ecosystem and enabling environment to foster Internet of Things (including technology, standards, cross-sartorial policy and regulatory frameworks, and applications) deployments

C06: To provide an understanding of the technologies and the standards relating to the IoT

CO7: To develop skills on IoT technical planning and Identify how IoT differs from traditional data.

UNIT-I   12 Hrs.

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle, IoT challenges.

UNIT-II   12 Hrs.

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT-III   12 Hrs.

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib. IoT Physical Devices and Endpoints -- Introduction to Arduino, Arduino UNO, Fundamentals of Arduino Programming. Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT-IV   12 Hrs.

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework, Designing a RESTful web API.

REFERENCE BOOKS:

1.   Arshdeep Bahga and Vijay Madisetti,,Internet of Things - A Hands-on Approach, Universities Press, 2015, ISBN: 9788173719547

2.   Matt Richardson & Shawn Wallace, Getting Started with Raspberry Pi, O'Reilly (SPD), 2014, ISBN: 9789350239759.