

## TH-2 INTERNET OF THINGS

(Common to CSE/IT)

<b>Theory</b>	<b>4 Periods per week</b>	<b>Internal Assessment</b>	<b>20 Marks</b>
<b>Total Periods</b>	<b>60 Periods</b>	<b>End Sem Exam</b>	<b>80 Marks</b>
<b>Examination</b>	<b>3hours</b>	<b>Total Marks</b>	<b>100Marks</b>

### A. Topic wise distribution of periods

Sl. No.	Topics	Periods
1	Introduction to Internet of Things	6
2	IoT Networking	6
3	Connectivity Technologies	6
4	Wireless Sensor Networks	6
5	M2M Communication	6
6	Programming with Arduino	5
7	Programming with Raspberry Pi	5
8	Software defined Networking	6
9	Smart Homes	5
10	Smart Cities	5
11	Industrial IoT	4
	<b>TOTAL</b>	<b>60</b>

### B. RATIONALE

IoT is a new Technology which shall make revolutionary changes in all fields of Life including Industries. Smart cities are the best place where applications of IoT can be predominantly seen. IoT involves extensive use of sensors, network, actuators, micro controllers ,software. Using such components in network shall bring versatile usage of IoT through Cloud service.

**C. OBJECTIVE:** After completion of this course the student will be able to:

- Know what IoT is
- Know Physical and Logical design of IoT
- Understand the other Technology associated with IoT
- Know the areas of applications of IoT
- Understand the concept of IIoT
- Know the working with Arduino and Raspberry Pi

### D. DETAIL CONTENTS:

#### 1. Introduction to Internet of Things

- 1.1 Introduction
- 1.2 Characteristics of IoT
- 1.3 Applications of IoT
- 1.4 IoT Categories

- 1.5 IoT Enablers and connectivity layers
- 1.6 Baseline Technologies
- 1.1 Sensor
- 1.2 Actuator
- 1.3 IoT components and implementation
- 1.4 Challenges for IoT
- 2. **IOT Networking**
  - 2.1 Terminologies
  - 2.2 Gateway Prefix allotment
  - 2.3 Impact of mobility on Addressing
  - 2.4 Multihoming
  - 2.5 Deviation from regular Web
  - 2.6 IoT identification and Data protocols
- 3. **Connectivity Technologies**
  - 3.1 Introduction
  - 3.2 IEEE 802.15.4
  - 3.3 ZigBee, 6LoWPAN
  - 3.4 RFID, HART and wireless HART
  - 3.5 NFC, Bluetooth, Z wave, ISA100.11.A
- 4. **Wireless Sensor Networks**
  - 4.1 Introduction
  - 4.2 Components of a sensor node
  - 4.3 Modes of Detection
  - 4.4 Challenges in WSN
  - 4.5 Sensor Web
  - 4.6 Cooperation and Behaviour of Nodes in WSN
  - 4.7 Self Management of WSN
  - 4.8 Social sensing WSN
  - 4.9 Application of WSN
  - 4.10 Wireless Multimedia sensor network
  - 4.11 Wireless Nanosensor Networks
  - 4.12 Underwater acoustic sensor networks
  - 4.13 WSN Coverage
  - 4.14 Stationary WSN, Mobile WSN
- 5. **M2M Communication**
  - 5.1 M2M communication
  - 5.2 M2M Ecosystem
  - 5.3 M2M service Platform
  - 5.4 Interoperability
- 6. **Programming with Arduino**
  - 6.1 Features of Arduino
  - 6.2 Components of Arduino Board
  - 6.3 Arduino IDE
  - 6.4 Case Studies
- 7. **Programming with Raspberry Pi**
  - 7.1 Architecture and Pin Configuration
  - 7.2 Case studies
  - 7.3 Implementation of IoT with Raspberry Pi
- 8. **Software defined Networking**
  - 8.1 Limitation of current network
  - 8.2 Origin of SDN
  - 8.3 SDN Architecture
  - 8.4 Rule Placement, Open flow Protocol
  - 8.5 Controller placement
  - 8.6 Security in SDN
  - 8.7 Integrating SDN in IoT
- 9. **Smart Homes**
  - 9.1 Origin and example of Smart Home Technologies
  - 9.2 Smart Home Implementation
  - 9.3 Home Area Networks(HAN)
  - 9.4 Smart Home benefits and issues
- 10. **Smart Cities**
  - 10.1 Characteristics of Smart Cities

- 10.2 Smart city Frameworks
- 10.3 Challenges in Smart cities
- 10.4 Data Fusion
- 10.5 Smart Parking
- 10.6 Energy Management in Smart cities
- 11. Industrial IoT**
  - 11.1 IIoT requirements
  - 11.2 Design considerations
  - 11.3 Applications of IIoT
  - 11.4 Benefits of IIoT
  - 11.5 Challenges of IIoT

**Coverage of Syllabus upto Internal Exams (I.A.)**

**Chapter 1,2,3,4**

**Books Recommended :-**

Sl.No	Name of Authors	Title of the Book	Name of the publisher
01	Jeeva Jose	Internet of Things	Khanna Books
02	Arsheep Bhaga, Vijay Madiseti	Internet of Things A Hands-on approach	University press