



## Department of Computer Science and Engineering

### SYLLABUS

#### **FUNDAMENTALS OF INTERNET OF THINGS (OE – I)**

##### **B.Tech. III Year II Sem.**

<b>Course Code</b>	<b>Category</b>	<b>Hours/ Week</b>			<b>Credits</b>	<b>Maximum Marks</b>		
		<b>L</b>	<b>T</b>	<b>P</b>		<b>CIE</b>	<b>SEE</b>	<b>TOTAL</b>
<b>23EC614</b>	<b>Open Elective</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>40</b>	<b>60</b>	<b>100</b>
<b>Contact Classes: 48</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: -</b>			<b>Total Classes:48</b>			

**Course Objectives:** The objectives of the course are to:

- Make concepts of Internet of Things understandable to build IoT applications.
- Teach the programming and use of Arduino and Raspberry Pi boards.
- Provide Knowledge about data handling and analytics in SDN.

**Course Outcomes:** Upon completing this course, the students will be able to

- Know basic protocols in sensor networks.
- Program and configure Arduino boards for various designs.
- Python programming and interfacing for Raspberry Pi.
- Design IoT applications in different domains.

#### **UNIT – I**

**Introduction to Internet of Things:** Characteristics of IoT, Physical design of IoT, Functional blocks of IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks.

#### **UNIT - II**

**Machine-to-Machine Communications:** Difference between IoT and M2M, Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino.

#### **UNIT – III**

**Introduction to Python programming:** Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi.

#### **UNIT - IV**

**Implementation of IoT with Raspberry Pi:** Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics.

## **UNIT - V**

**Cloud Computing:** Sensor-Cloud, Smart Cities and Smart Homes, Connected Vehicles, Smart Grid, Industrial IoT. Case Study: Agriculture, Healthcare, Activity Monitoring

### **TEXT BOOKS:**

1. "The Internet 'of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
2. "Make sensors": Terokarvinen, kemo, karvinen and villeyvaltokari, 1st edition, maker media, 2014.
3. "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti

### **REFERENCE BOOKS:**

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice".
3. Beginning Sensor networks with Arduino and Raspberry Pi – Charles Bell, Apress, 2013