**Annexure 1**

**Detailed Syllabus of Course**

| S. No | Module Title | Topics | Duration (Hours) | | Learning Outcome |
|-------|--------------|--------|------------------|-----|------------------|
| | | | **Theory** | **Lab** | |
| 1. | **IoT Introduction & Concepts** | • IoT Architecture <br> • Physical & Logical IoT design Basics <br> • IoT Enabling Technologies <br> • IoT Stack <br> • IoT Applications | 4 | 1 | •Understand the Architecture of IoT <br><br> •Building Blocks in development of IoT <br><br> •IoT Applications |

| 2 | **Sensors & Actuators** | • Sensor working<br>• Sensor Characteristics<br>• Types of sensors and working principle<br>• Sensors used in IoT | 2 | 1 | • Understand the working principle of sensors and actuators<br><br>• Sensors to be used for IoT applications |
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| 3 | **IoT Hardware platforms** | • IoT Hardware platforms<br>• Specifications and interfaces<br>• Serial Communication Protocols<br>• Arduino IDE<br>• Arduino Programming<br>• Interfacing various sensors, modules and devices to Arduino | 6 | 20 | • Working with Arduino IDE<br>• Program Arduino board<br>• Connect and program various peripherals with Arduino Uno |

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| 4 | **Networking Fundamentals** | •TCP/IP Basics<br>•IPV6<br>•Network devices & configurations<br>•Web servers & Socket programming | 4 | 4 | • Understand the Networking basics required to set up IoT application.<br>• Understand various IoT communication protocols |
| 5 | **Wireless for IoT** | •Overview of Wireless Sensor Networks<br>•IEEE standards for IoT<br>•Overview of Wireless Modems (RF, GSM/GPRS, Bluetooth, RFID, Wi-Fi etc.)<br>•NodeMCU and ESP32 | 6 | 20 | • Understand the technologies involved in IoT<br>• Interface various wireless modules to embedded systems applications.<br>• Build a wireless sensor network for IoT Application |

| 6 | **IoT Protocols** | •IoT Protocol overview<br>•MQTT<br>•COAP<br>•HTTP/HTTPS<br>•6lowpan | 3 | 3 | • Understand various IoT communication protocols<br>• Implementation of MQTT and COAP protocols |
| --- | --- | --- | --- | --- | --- |
| 7 | **IoT Graphical user interface and back end Application Design** | •Web development for IoT<br>•Introduction to HTML and PHP<br>•IoT application development for Mobile | 2 | 6 | • Understand the IoT application development tools.<br>• Understand how to Implement IoT Applications |

| 8 | **Cloud platforms for IoT** | • IoT dashboards <br> • Introduction to various cloud platforms <br> • Device and data management from Cloud Platforms <br> • Uploading data from hardware platforms to cloud | 3 | 5 | • Data collection and representation on various cloud based Dashboard <br> • Data analysis and decision making for various application |
|---|---|---|---|---|---|
| Total | | | **90 Hours(Theory-30, Lab-60)** | | |