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|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subject Code: 2ET4070502</b> | <b>Subject Title: Internet Of Things</b>                                                                                                                                                                                                                                                                                                     |
| <b>Pre-Requisite</b>            | <ul style="list-style-type: none"> <li>The students will be requiring participating actively in creative thinking exercises.</li> <li>IOT is futuristic and will require students to understand other technologies and current uses where IOT can be integrated to make a quantum jump in the in the efficiencies in application.</li> </ul> |

**TEACHING AND EVALUATION SCHEME:**

| Teaching Scheme (Hours per week) |          |           |        | Evaluation Scheme (Marks) |                       |                       |                       |
|----------------------------------|----------|-----------|--------|---------------------------|-----------------------|-----------------------|-----------------------|
| Lecture                          | Tutorial | Practical | Credit | Theory                    |                       | Practical             |                       |
|                                  |          |           |        | University Assessment     | Continuous Assessment | University Assessment | Continuous assessment |
| 3                                | -        | 2         | 4      | 60                        | 40                    | 20                    | 30                    |

**DETAILS OF COURSE CONTENTS:**

| Sr. NO. | TOPIC                                                                                                                                                                                                                                                                                                                            | Total Hrs. | Weightage |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|
| 1       | <b>Overview of IoT and High-level Architecture</b> <ul style="list-style-type: none"> <li>Introduction</li> <li>IoT and its characteristics</li> <li>Design of IoT physical, logical</li> <li>Blocks of IoT, Communication models &amp; APIs</li> <li>Benefits, Risks, Privacy, and Security</li> </ul>                          | 08         | 20%       |
| 2       | <b>Getting Started with Arduino</b> <ul style="list-style-type: none"> <li>Introduction to Arduino</li> <li>Pin configuration and architecture</li> <li>Device and platform features.</li> <li>Concept of digital and analog ports</li> <li>Arduino Interfacing Board</li> </ul>                                                 | 08         | 20%       |
| 3       | <b>Working with Arduino Sensors</b> <ul style="list-style-type: none"> <li>Arduino – Humidity Sensor</li> <li>Arduino – Temperature Sensor</li> <li>Arduino – Water Detector /Sensor</li> <li>Arduino – PIR Sensor</li> <li>Arduino – Ultrasonic Sensor</li> <li>Arduino – Connecting Switch(Magnetic relay switches)</li> </ul> | 08         | 20%       |
| 4       | <b>Introduction to raspberry pi</b> <ul style="list-style-type: none"> <li>Raspberry Pi Board</li> <li>Raspberry Pi vs. Arduino</li> <li>Operating System Benefits</li> <li>Raspberry Pi IoT</li> <li>Raspberry Pi Setup</li> <li>Raspberry Pi Configuration</li> </ul>                                                          | 08         | 20%       |

|   |                                                                                                                                                                                          |    |     |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|
| 5 | <b>Interfaces in raspberry pi</b> <ul style="list-style-type: none"> <li>• General purpose IO pins</li> <li>• protocol pins</li> <li>• GPIO Access</li> <li>• 8266 interfaces</li> </ul> | 08 | 20% |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|

### **COURSE OUTCOME:**

The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes:

- To understand IOT architectures, characteristics and design
- To understand Arduino architecture and able to build devices using it
- To build sensing device using Arduino architecture
- To understand raspberry pi devices and its architecture
- To build device using raspberry pi interface

The practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate course learning outcomes.

### **LIST OF PRACTICAL:**

1. Sensing water using water detector sensor using Arduino
2. Sensing temperature with temperature sensor using Arduino
3. Sensing humidity with humidity sensor using Arduino
4. Sensing ultrasonic sensor using Arduino
5. Setup and operate the Raspberry Pi
6. Program the Pi to control light emitting diodes (LEDs) attached to the GPIO pins
7. Program the Pi to detect room light from a photocell sensor connected to the GPIO pins
8. Program the Pi to get the temperature from a sensor connected to the GPIO pins
9. Learn to interface with 8266

### **LIST OF REFERENCES:**

| No | Title of Reference Books          | Authors                   | Publication |
|----|-----------------------------------|---------------------------|-------------|
| 1  | Learning Internet of Things       | Waher                     | PACKT       |
| 2  | Getting Started with Arduino      | Massimo Banzi             | PACKT       |
| 3  | Getting Started with Raspberry Pi | Wallance ,Matt Richardson |             |

**Mapping of CLO with PO and PSO**

| Course Learning Outcomes | Program Outcomes(POs) |     |     |     |     |     |     |     |     |      |      |      | Program Specific Outcomes(PSOs) |      |      |      |
|--------------------------|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|---------------------------------|------|------|------|
|                          | PO1                   | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1                            | PSO2 | PSO3 | PSO4 |
| CLO1                     | H                     | M   |     |     | M   | L   |     |     |     |      |      |      | H                               |      |      |      |
| CLO2                     | H                     | M   | M   | L   | H   | L   |     |     |     |      |      |      | H                               | M    |      |      |
| CLO3                     | M                     | H   | H   | M   | H   | M   |     |     |     |      |      |      | H                               | M    |      |      |
| CLO4                     | M                     | M   | L   | L   | H   | M   |     |     |     |      |      |      | M                               | H    |      |      |
| CLO5                     | M                     | H   | H   | M   | H   | M   |     |     |     |      |      |      | H                               | H    | M    |      |

**H:High, M:Medium, L:Low**