**GOVERNMENT OF TAMILNADU**
**DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI**
**STATE PROJECT COORDINATION UNIT**
**(Established under Canada India Institutional Cooperation Project )**

## CURRICULUM

| | |
|---|---|
| Course Name | INTERNET OF THINGS |
| Course Code | CSE/2020/024 |
| Course Duration | 60 hrs |
| Minimum Eligibility Criteria and Pre-requisites (if any) | ITI/10th/+2/Diploma/Graduates<br>Basics knowledge of computer |
| | |
| Course Objectives | The main course objective is to understand the concept of Internet of Things. And to know how to design IoT applications for automation and industrial purposes. |
| | |
| Course Outcomes | The end of training, the participants will be able to<br>● Describe the protocols and architecture of IoT.<br>● Design various applications of IoT using Raspberry Pi. |
| | |
| Expected Job Roles | IoT, Python programmer |

| TEACHING AND SCHEME OF EXAMINATION | | | | | | |
|---|---|---|---|---|---|---|
| Course Code | Course Name | Hours | | Assessment Marks | | Duration of Examination |
| | | | | Min | Max | |
| CSE/2020/024 | Internet of Things | Theory | 20 | 10 | 20 | 3 Hours |
| | | Practical | 40 | 40 | 80 | |
| | | Total | 60 | 50 | 100 | |

## CSE/2020/024 - INTERNET OF THINGS

## DETAILED SYLLABUS

| UNIT NO | MODULES | NO.OF.HOURS THEORY |
|---|---|---|
| 1 | Introduction to IoT, Sensors and Actuators | 2 |
| 2 | IoT Architecture, Functional Blocks | 2 |
| 3 | Communication Protocols and Sensor Networks<br>Machine to Machine Communication, | 4 |
| 4 | Introduction to Raspberry Pi | 2 |
| 5 | Building IoT applications using Raspberry Pi | 2 |
| 6 | IoT Enabling Technologies-Cloud, Big Data, Embedded Systems, Protocols | 2 |
| 7 | IoT Cloud Infrastructure<br>IoT Domains, Home automation using IoT, Smart city projects | 4 |
| 8 | Industrial IoT | 2 |
| | **Total Theory Hours** | **20** |
| | **Total Practical Hours** | **40** |
| | **Total Hours** | **60** |

## PRACTICAL ( 40 HOURS )

1. Familiarize with Raspberry pi and install necessary software.
2. Interface LED/Buzzer to Raspberry pi and write a program to turn it on for 1 sec after every 3 sec.
3. Interface LED and push button to Raspberry pi and turn LED on when Push button is pressed.
4. Interface DHT11 sensor with Arduino/Raspberry Pi and write a program to print temperature and humidity readings on it.
5. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed.
6. To interface OLED with Raspberry pi and write a program to print temperature and humidity readings on it.
7. Interface Bluetooth with Raspberry Pi and write a program to send sensor data to smartphone using Bluetooth.
8. Interface Bluetooth with Raspberry Pi and write a program to turn LED on/OFF when 1/0 is received from smartphone using Bluetooth.
9. Write a program on Raspberry pi to upload temperature and humidity data using thingspeak cloud.
10. Write a program on Raspberry pi to retrieve temperature and humidity data using thingspeak cloud.

## HARDWARE AND SOFTWARE REQUIREMENT

| S.NO | LIST OF TOOLS /EQUIPMENTS |
|---|---|
| 1. | Raspberry pi |
| 2. | Arduino UNO |
| 3. | Sensors |
| 4. | Smart Phone |
| 5. | Computer with internet connection |

## REFERENCE BOOKS

| S.NO | NAME OF THE BOOK | AUTHOR | PUBLISHER |
|---|---|---|---|
| 1. | Internet of Things: A Hands-On Approach | ArshdeepBahga, Vijay Madisetti | Orient Publisher |
| 2. | Internet of thngs | Jeeva Jose | Khanna Publishers |

## ASSESSMENT AND CERTIFICATION

| S.No | Criteria for assessment |
|---|---|
| 1. | A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the Project Polytechnic College for a duration of 3 hours |
| 2. | A trainee must have 75% of attendance to appear for End examination in Theory and Practical. |
| 3. | The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions) |
| 4. | The assessment for practical part will be based on the marks scored in the end examination conducted by the Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic. |
| 5. | The criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination. |
| 6. | On successful completion of training , Certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnic. |

## END EXAMINATION

## ALLOCATION OF MARKS

| S.No | Description | Max.Marks |
|---|---|---|
| 1. | Theory Examination | 20 |
| 2. | Practical Examination | |
| | a)Procedure | 10 |
| | b)Execution | 30 |
| | c)Output | 20 |
| | d)Record | 20 |
| | **Total Marks** | **100** |

## THEORY MODEL QUESTION PAPER

## CSE/2020/024 - INTERNET OF THINGS

(Maximum Marks : 20 )

(N.B: Answer any **twenty** questions) **20 x 1 = 20 Marks**

1. What are the main components of the IoT architecture?
2. What is a sensor in an IoT device?
3. What are some examples of sensors that can be used in agriculture?
4. What is a thermocouple sensor?
5. List layers of IoT protocol stack
6. Mention any two challenges in IoT .
7. What is MQTT?
8. Name some important IoT hardware
9. What is the language used by Raspberry Pi?
10. Write any two disadvantages of Raspberry Pi.
11. What is the NOOBS software all about?
12. How is Raspberry Pi used in IoT?
13. What is the full form of the LPWAN?
14. What is the real example of a smart grid device in IoT?
15. Which layer provides end-to-end communication in IoT?
16. What is the full form of HART?
17. What is the range of z-wave?
18. What is the full form of IaaS?
19. Which is the future application of IoT?
20. Which language is preferred for IoT analytics ?
21. What is the role of Big Data in IoT's Smart Grid architecture?
22. What is API?
23. Mention any two advantages of cloud in IoT
24. What is M2M?
25. What are the sensors used in Home Automation?