

CERTIFICATE COURSE IN INTERNET OF THINGS

(6 Months)



STATE BOARD OF TECHNICAL EDUCATION AND TRAINING
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Certificate Course in Internet of Things (IOT)

Duration of the Course : **6 Months**

Eligibility : **Intermediate or its equivalent**

Total Teaching Hrs : **250 Hrs**

Scheme of Instruction and Examination

Sub Code	Subject Name	Instruction Period/Week		Total Periods	Scheme of Examination			
		Theory	Practical			Duration	Internal Marks	End Exam Marks
THEORY								
IO-101	Internet of Things (IOT) - I	03	-	50	3Hrs	0	100	100
IO-102	Internet of Things (IOT) - II	03	-	50	3Hrs	0	100	100
PRACTICALS								
IO-103	Internet of Things-I LAB	-	04	75	3Hrs	40	60	100
IO-104	Internet of Things-II LAB	-	04	75	3Hrs	40	60	100
	TOTAL	06	08	250		80	320	400

Certificate Course in Internet of Things (IOT)

Subject Code	:	IO - 101
Subject Name	:	Internet of Things-I
Periods/Week	:	03 Hrs
Total Periods	:	50 Hrs

About Course

IOT Certification Course is tailored by industry experts. You will be working on Raspberry Pi and Arduino will gain hands on experience. It will also cover in-depth concepts such as IOT Framework, IOT Ecosystem and IOT Solution architecture.

Course Objectives: This course enables the students to

- Understand the uses and risks related to IOT Devices
- Develop and use of IOT Technology in Societal and Industrial Applications
- Understand the Fundamentals of sensing and sensor devices.

Course Outcomes: On completion of this course the students are able to

- Learn the basics of IoT.
- Write Basic Python Programs
- Understand IoT architecture and IoT decision framework.
- To understand various IoT Networking Protocols which can be used to develop IoT solutions?
- To Configure Raspberry Pi and Arduino.
- Write Python programs on Raspberry Pi

UNIT-1: Introduction to IOT (7 Hrs)

IOT Key Features, Advantages and disadvantages, Applications, Installation of Arduino
Installation of Raspberry pi.

UNIT -2: IOT using Raspberry Pi (10 Hrs)

Introduction and setup, IP Address of Raspberry Pi, Configuration of Raspberry pi, Working with pins of Raspberry Pi, Programming Raspberry Pi Pins, Python3 Code on Raspberry Pi

UNIT -3: File System & GPIO- Raspberry Pi (10 Hrs)

File System, Writing Text File, Blinking LED and Programming Pin, Button and LED working together, Reading an Input from button, Reading the values of pins, creating a PWM Object, Varying the Intensity of Light.

UNIT -4: Stings, Lists and Functions (10 Hrs)

Alternate Elements in String, Data Structures in Python, Slicing Operator in String
List in Python, List comprehension, Creating own Data Structure, Defining the new Function.

UNIT -5: Control Statements, Tuples, sets and Dictionaries (8 Hrs)

Conditional Statements, Looping Statements, Using Break Keyword, Redefining the values
Understanding Set Data Structure, Working with Tuples, Dictionary Data Structures

UNIT -6: Classes and Objects (5 Hrs)

Analyzing changes in parameter, Defining the get count method, Learning more on class and object, Creating a Function method, Creating an object of a class, Correcting the import code, Running from the module.

Certificate Course in Internet of Things (IOT)

Subject Code	:	IO - 102
Subject Name	:	Internet of Things-II
Periods/Week	:	03 Hrs
Total Periods	:	50 Hrs

About Course

This Course will cover in-depth concepts such as Networking Protocols and Application Layer Protocols, sending E-mails, working with sensors. This Course will have real life demo and case studies which will help you master in the IOT technology.

Course Objectives: This course enables the students to

- Understand the uses and risks related to IOT Devices
- Develop and use of IOT Technology in Societal and Industrial Applications
- Understand the Fundamentals of sensing and sensor devices.

Course Outcomes: On completion of this course the students are able to

- Understand various IoT Networking Protocols which can be used to develop IoT solutions?
- Configure the server and SMTP protocol.
- Understand Remote Monitoring and create your own IoT solution for monitoring.
- Implement applications of various sensors like Ultrasonic, DHT11, IR sensor, Light sensors, Gas Sensors, etc.

UNIT-1: Networking Basics (10 Hrs)

Client or The Server Address, IP Address and Port Number, Networking in Python
Setting up the SSH Client, Programming Client and Server, Connecting to the server
Coding the Socket, Updating status with Image.

UNIT -2: Creating Server and Sending E-Mail (10 Hrs)

Analysing the connection on the port, checking the button, creating connections
Sending email to Raspberry Pi, SMTP Authentication Error, Server Creation, Connecting the
DHT Sensor, E-Mailing Humidity and Temperature, mailing the Sensor values.

UNIT -3: Working with Arduino (10 Hrs)

Understanding Arduino Board, Pin Diagram, Basic Arduino Programming, L293D drivers
Arduino Driver Shield.

UNIT -4: Working with Sensors (10 Hrs)

Ultrasonic Sensors, IR Sensor, Temperature and Humidity Sensor, Light Sensor, Pressure
Sensor, MQ3 Sensor, Fire Detection Sensor.

UNIT -5: Building IOT Projects-I (5 Hrs)

Intelligent Traffic Systems,
Smart Parking System.

UNIT -6: Building IOT Projects-II (5 Hrs)

Smart Water Management,
Alcohol Detection

Certificate Course in Internet of Things (IOT)

Subject Code : IO - 103
Subject Name : Internet of Things-I LAB
Periods/Week : 04 Hrs
Total Periods : 75 Hrs

Course Objectives: This course enables the students to

- Understand the uses and risks related to IOT Devices
- Develop and use of IOT Technology in Societal and Industrial Applications
- Understand the Fundamentals of sensing and sensor devices.

List of Experiments

1. **a)** Study and Install IDE of Arduino and different types of Arduino.
b) Study and Install Raspberry Pi.
2. Write a Program for arithmetic operation in Arduino
3. **a)** Write a Program for looping statement in Arduino
b) Write program using Arduino IDE for Blink LED
4. Study the Temperature sensor and Write Program for monitor temperature using Arduino.
5. **a)** WAP for LED blink using Raspberry Pi.
b) WAP on Class and Objects using Python in Raspberry Pi
- 6 **a)** Write a Program on String Operations in Arduino
b) Write a Program on List Operations in Arduino.

Certificate Course in Internet of Things (IOT)

Subject Code	:	IO - 104
Subject Name	:	Internet of Things-II LAB
Periods/Week	:	04 Hrs
Total Periods	:	75 Hrs

Course Outcomes: This course enables the students to

- Understand the uses and risks related to IOT Devices
- Develop and use of IOT Technology in Societal and Industrial Applications
- Understand the Fundamentals of sensing and sensor devices.

List of Experiments

1. **a)** write a program to display the distance of object with ultrasonic sensor using Arduino
b) Study and implement Gas Sensor
2. **a)** Write a Program using Arduino to display “World of IOT” in LCD
b) Study and Implement LDR (Light Dependent Resistor)
3. **a)** Study and Implement PIR Sensor
b) Write a Program to Read Water Flow Rate with Water Flow Sensor
4. **a)** Write a Program to Test IR Remote with TSOP.
b) Study and Implement Soil Moisture Sensor.
5. Write a program to detect object with IR Sensor using Arduino
6. Write a Program to display Humidity and Temperature using DTH11 using Arduino/Raspberry Pi.