

## IOT (Internet of Things) Syllabus

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In today's rapidly changing technology it's very important to stay updated. Internet of Things is one such revolution in technology world where more number of devices are connected to the internet than human population. IoT has brought many new business aspects as well as technological challenges in recent times. This course allows you to get updated about latest technological changes as well as opens up the new opportunities for making a change.

### Module 1 : Internet of Things - An Introduction

- Session 1: Introduction & Architecture of IoT (1.5 hrs)
  - Introduction of Internet of Things
    - Concepts and definitions of IoT
    - History of IoT
    - Applications
    - Requirements of IoT
  - Market Trends
  - Opportunities in IOT
  - Challenges & Future

### Session 2: IoT Application Stack (1.5 hrs)

- IOT Architecture
  - Major components of IoT
  - IoT enabling technologies
  - IoT Standards
  - IoT Entities
- Sensors, Actuators
- Gateways
- Cloud
- Mobile/Web Applications

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Classroom

| Corporate

| Online

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### Module 2: IoT Software Stack

#### ➤ **Session 1: Programming Languages & Coding (3 hrs.)**

- Learning C Programming
- Learning Python
- Learning C++

#### ➤ **Session 2: Operating Systems (2 hrs)**

- Introduction to Operating Systems
- OS Fundamentals
- OS Architecture
- Processes & Tasks
- Memory Management
- Hardware Management
- Introduction Real time Operating Systems
- GPOS vs. RTOS
- Characteristics of RTOS
- Application of RTOS

#### ➤ **Session 3: Linux (2 hrs)**

- Getting Started with Linux
- Introduction to Linux
- Linux command line
- Linux Shell
- Package management
- Internals, application and IoT Support

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### **Module 3: IoT Hardware Stack**

- Session 1: Computer Architecture & Embedded Hardware (2 hrs.)
  - Introduction to computer architecture
  - Pipelining & Memory Management
  - Introduction to ARM Architecture
- Session 2: Arduino - Hands on Experience (6 hrs.)
  - General Purpose I/O(GPIO)
  - Serial Communication Interfaces: RS-232/485
  - Synchronous Peripheral Interfaces: I2C,SPI
  - Sensors interfacing with Arduino

#### **Mini Project:** Application development on Arduino

- Session 3: Raspberry PI - An Embedded PC (8 hrs.)
  - Introduction to Raspberry PI
  - Installation & Setting up Raspberry PI
  - General Purpose I/O(GPIO)
  - Serial Communication Interfaces: RS-232/485
  - Synchronous Peripheral Interfaces: I2C,SPI
  - Sensors Interfacing with Raspberry PI

#### **Mini Project:** Application development with Raspberry PI

### **Module 4 : Wireless Sensor Networks & Data Communications**

- Session 1: Introduction to WSNs (2 hrs.)
  - Introduction to WSNs
    - Topologies in WSNs
  - Wired Communication Protocols
    - Ethernet
    - Serial Communications

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- Wireless Communication protocols
  - Wifi
  - RF
  - IPV4/V6
  - 6LOWPAN
  - ZigBee(IEEE802.15.4)
  - BLE
  - GSM(2G/3G/LTE)

### Module 5 : Machine to Machine Communication

- Session 1: Getting started with M2M (2 hrs.)
  - Role of M2M in IoT
  - IoT M2M Protocols
    - MQTT/MQTT-SN,
    - COAP

**Mini Project:** Communicating devices with devices

### Module 6 : Cloud computing and data representation

- Session 1: IoT with Amazon Web Services (3 hrs.)
  - Introduction to Amazon Web Services
  - Integration of AWS with IoT
  - Creating IoT device on cloud
  - Creating Dashboard on cloud

### Major Project (12 hrs.)

Development of IoT application by connecting devices to the cloud with data representation

- Smart Home
- Smart Transportation
- Smart Health