



QJ Technologies

PROPOSAL FOR

Internet *of Things* (IoT) **Training Course**

“For anyone who wants to get started with Internet of Things, understand the contents of connecting sensors and actuators to the internet, this workshop is the right start.”

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 Off.No-509, Sterling Centre, Opp. Hotel Aurora Towers, MG Road, Camp, Pune.



Course Description

IOT Course by QJ Technologies, provides best and most relative contents required for making the participants comfortable with the concepts of IOT. The Course's main motive will be to help attendees get started with small things in IOT and motivate them to gain knowledge on deeper concepts.

Key Features of Course

- **Organized Content**

The contents of the Course are properly organized and arranged for better understanding of the concepts and help them grasp new things faster and enhance their knowledge.

- **Best Illustration**

The concepts, codes and tools are well illustrated by our experts through slides and practical performance which will help the concepts to be cleared faster and solve all the doubts.

- **Certificate and Toolkit**

Course completion certificate will be provided at the end of the Course.



Course Contents:-

1. Dive into Internet of Things and Embedded Systems

1. Explaining Internet of things

- a. The Big Idea- IOT and its Working
- b. Defining IoT with example
- c. IOT Devices
- d. Computers v/s IOT devices

2. Trends and Adoption of Internet of Things

- a. Trends and Adoption of Internet of Things
- b. Adoption of IOT
- c. Powerful and pervasive nature of IOT

3. Need for Internet of Things in Society

- a. Benefits of IOT in society.
- b. Risks, Privacy and Security

4. Walk-through with Embedded Systems

- a. Defining Embedded Systems with its features and constraints
 - i. What are embedded Systems?
 - ii. Explaining generic embedded system structure
- b. Embedded System Components
 - i. Details on Embedded System Components
 - ii. Sensors and Actuators
- c. Physical world Interaction
 - i. Analog/Digital Conversion
 - ii. Introduction to basic equipments

5. Playing with Hardware and Software

- a. A look at Hardware components
 - i. Hardware and Software
 - ii. Integrated Circuits
 - iii. Properties of Micro-controllers
- b. Software and Micro-controller
 - i. Components of Micro-controllers



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Internet of Things Training Course

- ii. **Compilation and Interpretation**
 - iii. **C/C++ vs Python**
 - c. **Operating Systems**
 - i. **An overview with Operating Systems**
 - ii. **Supporting Tasks**

- 6. **Internet and Networking**
 - a. **Basics of Networking**
 - i. **Why is networking important?**
 - ii. **LAN and WAN Structure**
 - iii. **Components for networking**
 - b. **Layered Networking and MANET**
 - i. **ISO/OSI Reference Model**
 - ii. **TCP/IP Protocol Stack**
 - iii. **MANETs**
 - iv. **Live packet capture and analysis.**
 - c. **Protocols of Internet and their need**
 - i. **Structure of Internet**
 - ii. **Protocols**
 - iii. **Protocol Stack**



II. Arduino Platform, Programming and Interfacing

1. Understanding Arduino and Arduino Environment

- a. Arduino Platform
- b. Arduino Board and Programming
- c. Arduino schematics
- d. Arduino IDE
- e. Arduino Shields and Libraries
- f. Arduino Setup for getting started.

2. C Programming basics for Arduino

- a. Setting up the Environment
- b. Hello World
- c. Variables
- d. C Operators
- e. Conditions
- f. Loops
- g. Functions
- h. Local and Global Variables

3. Getting started with Arduino Programming

- a. Arduino Toolchain and Sketches
- b. Classes
- c. Understanding Arduino Pins
- d. Playing with Input and Output
- e. Writing a Blink Application

4. Debugging and Serial Communication

- a. Debugging and Debug Environment
- b. Debugging via. Serial
- c. UART Protocol
- d. UART Synchronization
- e. UART Parity and Stop
- f. Serial on Arduino
- g. Reading from Serial



- 5. Hardware Design, Components and Circuits**
 - a. Electrical Circuits, Properties and Ohm's law**
 - b. Electrical Components, diodes, switches**
 - c. Wiring a Push Button**
 - d. Wiring a Potentiometer**
- 6. Interfacing with Sensors and Actuators**
 - a. Sensors and Resistive Sensors**
 - b. Actuators**
 - c. Digital and Analog Actuators**
 - d. Pulse Width Modulation**
 - e. Fade Examples**
 - f. Making Sounds examples**
- 7. Introduction to Software Libraries with Arduino**
 - a. Arduino Libraries**
 - b. EEPROM**
 - c. Masking**
 - d. I2C Communications**
- 8. Extending Arduino Capabilities with Shields**
 - a. Basics of Arduino Shields**
 - b. Ethernet Shield and Library**
 - c. Ethernet Shield Client/Server**
 - d. Transmitting sensor data over Internet**



III. Raspberry Pi: Platforms, Programming and Interfacing

1. Getting Started with Raspberry Pi

- a. Understanding components of Raspberry Pi Board
- b. Raspberry Pi Processor
- c. Raspberry Pi v/s Arduino
- d. Benefits of an Operating System
- e. Processes and Process Management
- f. IoT with Raspberry Pi
- g. Raspberry Pi Setup
- h. Raspberry Pi Configurations
- i. Overclocking Raspberry Pi device

2. A walk-through with Linux

- a. Linux Basics
- b. Linux Filesystem
- c. Filesystem Navigation
- d. Text Editors
- e. Linux File Access
- f. Linux File Permissions
- g. Linux Processes
- h. Linux GUI

3. Basis of Python Programming language

- a. Setting up Python on Raspberry Pi
- b. Python Programming Environment
- c. Python Expressions
- d. String Operations
- e. Functions and Arguments
- f. Control Flow
- g. Lists and List Methods

4. Raspberry Pi Networking

- a. Connecting to a Network
- b. Secure Shell
- c. SSH Server/Client Setup
- d. Internet Protocols
- e. Network Programs
- f. Working with IP Addresses



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Target Audience

Anyone who is motivated to know the Working of IoT and wants to get started with IoT

Who can Attend?:

Attendee can be any person with basic knowledge of computers and programming.

Duration:

80 Hours

Certificate:

Attendees will receive a course completion certificate at the end of the course.

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