

## IoT Learning Platform



Note Shown image is just for illustration original may differ

### Features

- In-depth practical learning on IoT
- Linux based design
- Linux Operating System porting
- Linux python programming
- Study of Machine Learning Algorithms
- Qt IDE based GUI development
- Study of Sensor and Actuator interfacing
- Local cloud & server configuration
- GUI Base IoT application development
- IoT Gateway Using WiFi and Ethernet
- Arduino board interface
- HDMI interface for display
- USB HID and CDC interface
- 4 channel ADC for Voltage input
- Input for Resistance measurement
- Input for 4-20mA measurement
- RS485, I2C, SPI Protocol interface
- LEDs interface
- Motor driver interface
- Color TFT display
- Serial to USB converter
- Office Suit
- Camera connectivity
- Connectors for external module interface
- GSM IoT gateway (optional)
- Zigbee interface (optional)

## Experiments

### Introduction to Internet of Things

- Definition of the Internet of Things
- The Importance of the Internet of Things
- History of IoT, Machine to Machine, Web of Things
- Overview of IoT Lab Hardware platforms
- The Layering concepts, IoT Communication Pattern, IoT protocols
- Understand IoT Market perspective in different segments.

### Operating System used for IoT

- Linux Operating System introduction
- Working with the command line and the Shell
- Managing directories and files
- Managing user access and security
- Setting up a Linux file system
- Understanding system initialization
- Connecting a system to the network
- Installing and Configuring Linux

### Shell Scripting Programming for IoT

- Introduction
- Creating Shell Scripts
- Flow control in the Shell
- Advanced Shell features

### Programming Language used in IoT

- C Programming , Python Programming & Arduino Programming

### Hardware Interfacing for IoT

- Sensors interfacing, Actuators interfacing

### Communication Protocol study for IoT

- UART and RS485 Communication
- I2C and SPI Protocol device interfacing
- MQTT Protocol
- Wi-Fi AP and Router interfacing
- GSM module interfacing (optional)

Database, Cloud and Server Configuration for IoT

Python Programs on Machine Learning Algorithms

Web and Application Development Tools for IoT

### Case study & advanced IoT Applications with :

- Smart Agriculture , Smart Environment Sensors
- Smart Industrial Sensors
- Smart Home Automation
- Smart Security Solutions

## Technical Specifications

Processor	: 64bit ARMv7 Quad Core Processor 1.2GHz
Connectivity	: 802.11 b/g/n Wireless LAN Bluetooth 4.1, zigbee, USB & Ethernet
RAM	: 1GB
Memory	: 32GB (upgradable)
OS	: Linux
Ethernet	: 10/100 BaseT Ethernet socket
Video Output	: HDMI and Composite RCA
Audio Output	: Audio Output 3.5mm jack
USB	: 4 nos.
Camera	: 15-pin MIPI Camera Serial Interface
LCD	: Color TFT LCD
Motor Driver	: Stepper and DC Motor
Analog Input	: 8 nos.
Relay Output	: 4 nos.
Buzzer Output	: 1 no.
Zigbee Frequency	: 2.4GHz
Power	: 5V, 2A

## Arduino board specifications

Microcontroller	: ATmega328
Operating Voltage	: 5V
Digital I/O Pins	: 14 (of which 6 provide PWM output)
Analog Input Pins	: 6
Flash Memory	: 32 KB including bootloader
SRAM	: 2 KB (ATmega328)
EEPROM	: 1 KB (Atmega328)
Clock Speed	: 16 MHz

### The training includes single user Classroom / laboratory teaching, learning and simulation software module.

The contents easy explanation of various complex topics with animation and simulation for ease of student learning. It is also support learning through videos, graphs, charts, along with mandatory rich content and theory to understand fundamental concepts, interactive learning objects, FAQ, MCQ etc. The content is supply either the digital online access or license protection

## Included Sensors and Actuators

DS18B20 Temperature sensor  
 Vibration switch module  
 Hall magnetic sensor module  
 Key switch module  
 Infrared emission sensor module  
 Laser sensor module  
 Small passive buzzer module  
 3-color full-color LED SMD modules  
 Photo interrupter module  
 2-color LED module  
 Active buzzer module  
 NTC thermistor sensor  
 DHT11 Temperature and humidity sensor  
 3-color LED module  
 Mercury open optical module  
 Photo resistor module  
 5V relay module  
 Tilt switch module  
 Mini magnetic reed sensor  
 Infrared sensor receiver module  
 XY-axis joystick module  
 Linear magnetic Hall sensors  
 Reed module  
 Flame sensor module  
 Magic light cup module  
 Soil moisture sensor  
 5mm red and green LED (common cathode) module  
 Knock sensor module  
 Obstacle avoidance sensor module  
 TCRT5000L sensor module  
 Automatic flashing colorful LED module  
 Analog Hall magnetic sensor module  
 Metal touch sensor module  
 Sensitive small microphone sensor module  
 Sensitive Big microphone sensor module  
 Finger measuring heartbeat module  
 Rotary encoder module