

IoT -Curriculum

1.Introduction to the domain

- Introduction to the course
- Brief Introduction to IoT
- IoT Architecture
- Embedded System
- Controller & Processor
- Creating an account on Tinkercad

2.Arduino

- Basics of Arduino
- LED
- Led Blinking Assignment 1
- Blinking Assignment Solution

3.Serial Communication

- Introduction to Serial Communication
- For Loop
- User Input
- Controlling with User Input
- Pushbutton LED

4.Pulse Width Modulation - PWM

- Introduction to PWM
- GPIO
- LED Forward Voltage
- Potentiometer
- String Input Assignment solution
- Potentiometer Mapping Assignment Solution

5.RBG (Red, Blue, GREEN)

- Concept of RBG
- Understanding Breadboard
- Sensor Basic & Ultrasonic Sensor
- Ultrasonic Sensor working
- Temperature Sensor
- PIR Sensor

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6.Robotics

- Introduction to Robotics
- DC Motor & L293D
- Command to Motor
- Motor
- Servo Motor

7.Remote Control Robot

- Introduction of Remote Control Robot
- Obstacle Avoidance Robot
- Speed Control of Motor

8.Introduction to IoT

- Basics of IoT
- Component of IoT
- Selection of IoT Board
- Case study on IoT Product

9.ThingSpeak

- Introduction to ThingSpeak
- ThingSpeak HTTP

10.Arduino IDE

- Introduction to Arduino IDE
- LED Blinking
- IR Sensor
- Ultrasonic Sensor
- Air Quality Sensor
- Soil Moisture Sensor
- DHT11 Sensor Serial Monitor
- DHT11 Sensor ThingSpeak

11.MIT App Inventor

- Introduction to MIT App
- Basic App
- Speech to Text App
- IoT App

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12.Smart Home Automation

- Introduction to Smart Home Automation
- Adafruit Dashboard
- IFTTT Applet
- Relay Application

13.Message Queuing Telemetry Transport (MQTT)

- MQTT Basics
- Mosquitto Process
- Mosquitto Authentication
- Adafruit MQTT

14.Python Programming

- Introduction to Python
- Basis of Python Programming
- Python Programming
- Pycharm Installation

15.Socket Programming

- Introduction to Socket Programming
- Server Client Implementation
- Socket Chat Room
- UART & I2C & SPI

16.Exersice

Covid-19 Dashboard

- **Real-Time Data Monitoring:** The COVID-19 dashboard leverages IoT devices to collect and display real-time data on infection rates, vaccinations, and recovery statistics, providing up-to-date information for users.
- **Interactive Visualizations:** Utilizing graphs, charts, and maps, the dashboard presents data in an accessible format, enabling users to track trends and identify hotspots at a glance.
- **Remote Sensor Integration:** IoT sensors gather data from various sources, such as health facilities and public spaces, ensuring comprehensive coverage and accurate reporting of COVID-19 metrics.
- **Alerts and Notifications:** The dashboard can send alerts for significant changes in data, such as spikes in cases or vaccination milestones, helping stakeholders make informed decisions and respond swiftly to the evolving situation.

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CAPSTONE PROJECTS

1 IoT-Based Smart Factory System

- Implement automated control for machines and processes in a factory setting.
- Use IoT to control and monitor factory systems from anywhere.
- Learn to improve productivity by minimizing manual interventions.
- Implement the concept of IIOT/Industrial 4.0 using control system

2 IoT-Based Weather Data System Using ESP32

- Interface weather sensors with ESP32 for temperature, humidity, and pressure data.
- Transmit weather data over Wi-Fi using MQTT protocols.
- Display and analyze live weather data on cloud platforms or dashboards.
- Gain experience in coding ESP32 for IoT applications.

3 IoT-Based Health Monitoring System Using ESP32

- Develops a health monitoring system that uses an ESP32 microcontroller, DHT22 sensor, LCD display, and Blynk IoT platform.
- Illustrate the wiring and connections between the ESP32 and health sensors, ensuring clarity in signal paths and power supply arrangements for accurate data acquisition.
- Monitors and displays body temperature and heart rate.
- Include details on how the ESP32 communicates with a cloud platform or mobile application for data transmission, specifying protocols like MQTT or HTTP for real-time health monitoring.

LIVE PROJECT

1 Obstacle Avoidance Robot Using Ultrasonic Sensor

- Learn to detect objects using ultrasonic sensors.
- Illustrate the placement of the ultrasonic sensor on the robot, specifying angles and distances from the chassis to optimize obstacle detection and improve accuracy.
- Include a flowchart that outlines the decision-making process of the robot, detailing how it interprets distance readings from the ultrasonic sensor to navigate and avoid obstacles in its path.
- Draft the wiring connections between the ultrasonic sensor, microcontroller (such as Arduino or Raspberry Pi), and the motors, ensuring proper power supply and signal pathways for effective operation.
- Apply concepts of robotics to create real-world problem-solving robots.