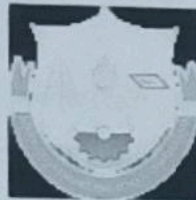


DEPARTMENT OF INFORMATION TECHNOLOGY & COMPUTER ENGINEERING



LESSON PLAN

SUBJECT: INTRODUCTION TO IOT *Lab.*

BRANCH: 5TH SEM, IT

FACULTY NAME: DR. ANITARANI BRAHMA

Jharsuguda Engineering School, Jharsuguda

Department of Information Technology

Vision:

To focus on development of skilled and confident personalities of today and tomorrow by using cutting edge technology in the department of Information Technology to accept need based challenges with a sense of social responsibilities.

Mission:

- M1: To impart quality education by implementing state-of- the- art teaching-learning methods to enrich the academic competency, credibility and integrity of the students.
- M2: To implement the educational program in our department from fundamental engineering to recent technology as per emerging trends in the field of Information Technology.
- M3: To facilitate a conducive ambience and infrastructure to develop professional skills and nurture innovation in students.
- M4: To inculcate sensitivity towards society, respect for environment and promote high standards of ethics.

LEARNING OUTCOMES:

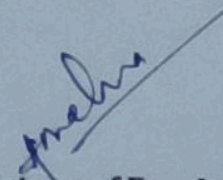
After completion of the course, the students will be able to:

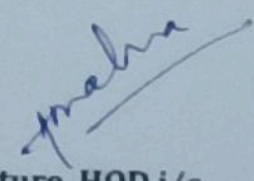
- Identify various IoT components, including microcontrollers, sensors, and communication protocols.
- Explain the working principles of IoT devices and protocols like MQTT, HTTP, and Wi-Fi communication.
- Interface sensors and actuators with Arduino and Raspberry Pi for data collection and automation.
- Process real-time sensor data and visualize insights using Python and cloud-based platforms.
- Implement security mechanisms like data encryption to ensure secure IoT communication.
- Develop a functional IoT application, such as a smart home automation system, integrating multiple IoT technologies.

SUBJECT NAME: Internet of Things Lab
SUBJECT CODE: PR1
FACULTY NAME: DR ANITARANI BRAHMA
HOURLY: 60 HR (WEEKLY LOAD 4HR)

Sl No	Lab No.	Experiment	Remark
0	1,2,3,4	Introduction to IOT Lab	Demonstration of Arduino, Raspberry Pi, Breadboard, Installation & Configuration of Arduino IDE
1		Setting up Arduino Uno Pi boards. Running a basic LED blink program.	Demonstration of boards and pin configuration; installation of required software; circuit connection; students write, compile and upload Blink program; troubleshooting hardware/software errors
		Viva	Installation of required software; circuit connection; students write, compile and upload Blink program; troubleshooting hardware/software errors
2		5,6,7	Connecting a temperature and humidity sensor (DHT11) to Arduino. Displaying sensor readings on the Serial Monitor.
	Viva		
3	8,9,10	Connecting a PIR motion sensor and LDR (Light Dependent Resistor). Displaying motion and light intensity values.	Explanation and demonstration of sensors; circuit construction; programming digital and analog inputs; testing under different light and motion conditions; recording observations
		Viva	
4	11,12,13	Interfacing a relay module with Arduino. Turning an LED or motor ON/OFF based on sensor input.	Demonstration of relay operation; wiring relay with Arduino; programming sensor-based switching; testing automatic ON/OFF operation; troubleshooting
		Viva	
5	14,15,16	Installing an MQTT broker (e.g., Mosquitto). Sending and receiving messages using MQTT.	Installation and configuration of MQTT broker; demonstration of Publisher/Subscriber model; sending and receiving messages; testing multiple topics; basic troubleshooting

		Viva	
6	17,18,19	Connecting an ESP8266 module to a Wi-Fi network. Sending sensor data to a cloud platform (ThingSpeak).	ESP8266 setup; Wi-Fi programming; creation of ThingSpeak channel; sensor data acquisition; HTTP/API-based data transmission; cloud visualization
		Viva	
7	20,21,22	Collecting and processing real-time sensor data. Implementing basic edge computing using Python.	Demonstration of Python environment; collection of sensor data; writing Python program; processing data locally; implementing threshold/decision logic; testing real-time response
		Viva	
8	23,24,25	Storing IoT sensor data in a CSV file. Visualizing the data using Matplotlib in Python.	Collection of sample/real-time sensor data; creation of CSV file; Python-based data storage; reading stored data; generation of line/bar graphs using Matplotlib; interpretation of graphs
		Viva	
9	26,27,28	Encrypting sensor data before transmission. Implementing simple AES encryption using Python.	Explanation of basic security concepts; installation of Python cryptography package; generation/use of AES key; encryption of sample sensor data; decryption and verification; discussion of secure transmission
		Viva	
10	29,30	Controlling home appliances using a web interface. Turning devices ON/OFF using HTTP requests. Controlling home appliances using a web interface. Turning devices ON/OFF using HTTP requests.	Creation of simple web interface; Arduino/ESP8266-based device control; sending HTTP requests; relay interfacing; testing appliance ON/OFF operation; complete mini IoT demonstration
		Viva	


Signature of Faculty


Signature, HOD i/c