

Subject Code – 2301CS593
Internet of Things
Faculty Name
Prof. Bhushan D. Joshi

Sr.No	Unit-1 Introduction to Internet of Things
1	Define the Internet of Things.
2	List the application of IoT
3	Discuss the characteristics of IoT.
4	What are the “things” in IoT?
5	Explain IoT Stack in detail.
6	List the IoT Layers.
7	With neat diagrammatic representation, explain the IoT stack with appropriate examples for each layer.
8	Elaborate Enabling Technology in IoT.
9	What is the role of different protocols in IoT?
10	Explain IoT Levels.
11	How does the classification of IoT as Level 1 to 5 happen? Explain.
12	Enumerate the role of cloud in IoT.
13	Explain the importance of communication protocols when it comes to IoT.
14	Discuss any three IoT network protocol.
15	Compare Bluetooth and ZigBee protocol.
16	List Advantages and Disadvantages of Bluetooth.
17	List Advantages and Disadvantages of Zigbee.
18	List Advantages and Disadvantages of LoRa protocol.
19	List Advantages and Disadvantages of Z wave.
	Unit 2: IoT Physical Devices and Endpoints
20	Compare IoT and M2M.
21	What is Arduino? Explain in detail.
22	Give the pin description with example of Arduino UNO.
23	Which architecture ATMEL ATmega328 follows? Write down it’s architectural feature.
24	What is development board? Draw Block diagram of Arduino UNO and define each block.
25	Write down all components of Arduino board
26	Explain the code structure of basic Arduino Program.
27	Define void setup() and void loop() function
28	Write down an Arduino functions for Serial communication in detail.
29	What is the function of PWM pins?
30	Explain functionalities of all the A0 to A5 pins.
31	Explain functionalities of all the digital pins.
32	Explain the layout of Arduino Uno with its components. (IMP)
33	Give the technical specifications of Arduino UNO. (IMP)
34	What are the Input and Output Pins of Arduino UNO?
35	Explain void setup() and void loop() functions. (IMP) or Code Structure of Arduino.
36	Describe Serial.begin(), Serial.print() and Serial.println() functions.
37	Describe the following functions with syntax and example (IMP) 1. digitalWrite()

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	2. digitalRead() 3. analogWrite() 4. analogRead() 5. delay() 6. millis() 7. map()
38	Explain Arduino function for the mathematical operations like square, square root, power, minimum and maximum.
39	Describe Arduino functions to read and write digital values.
40	Describe Arduino functions to read and write Analog values.
41	Explain pulseIn() function.
42	Explain map() function.
43	Describe dealy() and micros().
44	Write program to blink built-in LED
45	Write a code to control brightness of LED using potentiometer
46	Write down a code to print your name on serial monitor with 9600 baud rate.
47	Write a code to measure time duration of HIGH or LOW pulse on the specified pin using pulseIn() function.
48	What is Raspberry Pi? Explain in detail.
49	What is GPIO pins of Raspberry Pi.
50	Give the technical specifications of Raspberry Pi.
51	Write a Python Code for Blinking LED. (Raspberry Pi)
	Unit 3 : Sensors and Actuators interfacing with Micro controller
52	Define Sensor and list the different types of sensors.
53	Explain types of Sensor with example.
54	Mention the importance of sensors in IoT applications with appropriate examples.
55	Explain LDR sensor and PIR sensor with interfacing with Arduino UNO.
56	Take any reference and explain how a pH sensor can be used in an IoT application.
57	Write an Arduino code to detect presence of gas using MQ-02/05 Gas Sensor with Arduino Uno.
58	Explain the working principle of HC-SR04 Ultrasonic Sound Sensor.
59	Write a code for Arduino to measure light intensity in the environment using LDR Sensor.
60	Write an Arduino code to detect colour of object. (Colour Sensor)
61	What is actuators?
62	Define Actuators and explain Relay module with Pin-Out.
63	Describe Servo motor with Pin-Out.
64	Demonstrate all the methods of Servo class for Arduino.

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65	Write a code to control the motion of DC motor in forward and Reverse direction.
66	Assume you have a fan at your home. You wish to control the On/Off switch via the Internet. Design a system for its control. Draw the system architecture.
Unit 4 : IoT Protocols	
67	Explain asynchronous Serial Communication with UART.
68	Write a code for UART communication between two Arduino UNO board via software serial port.
69	Explain Synchronous Serial communication with SPI.
70	Explain I2C protocol in-detail.
71	Explain MQTT protocol with respect to IoT infrastructure.
72	Explain CoAP protocol in detail
73	Demonstrate interfacing of Bluetooth Module with Arduino.
74	Explain Zigbee and interfacing circuit of Xbee module with Arduino
Unit 5: Domain Specific Applications of IoT.	
75	Explain Cloud Computing.
76	What are the service models of the Cloud?
77	Explain Fog Computing.
78	What are the benefits of Fog Computing?
79	How is fog computing different from cloud computing?
80	Explain IAAS and SAAS services in detail.
81	Define Virtual Pins with respect to the Blynk Cloud.
82	Explain Blynk.virtualWrite() function to send or write data on the virtual pin or library function to write data on virtual pin
83	Explain BLYNK_WRITE() function to receive or read data from the virtual pin or Library function to read data from the virtual pin.
84	Explain common architecture of IoT applications.
85	Explain Healthcare Application with IoT.
86	Explain IoT Application in Retail.
87	Discuss Driver Assistance Application with IoT.
88	Explain Collision Impact Detection Using IoT.
89	Explain IoT Based Application for Water Quality Monitoring.