

Branch Name:	Information and Communication Technology
Semester/Year:	Semester VIII / Fourth Year
Subject Title:	Internet of Things(Elective-IV)
Subject Code:	1ET1070804
Pre-requisite:	Fundamentals of Computer Network, Wireless Sensor Network, Communication & Internet Technology, Web Technology, Information Security.

Course Objective:

The objective of this course is to impart necessary and practical knowledge of components of Internet of Things and develop skills required to build real-life IOT based projects.

Teaching and Examination Scheme:

Teaching Scheme (Hours Per Week)				Examination Scheme (Marks)				Total
L	T	P	Credit	Theory		Practical		
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Topic	Total Hrs.	% Weightage
1	Introduction to IoT: Architecture Overview, Design principles and needed capabilities, IoT Applications, Sensing Actuation, Basics of Networking, M2M and IoT Technology	08	18
2	Elements of IoT: Hardware Components- Computing (Arduino, Raspberry Pi), Communication, Sensing, Actuation, I/O interface, Software Components- Programming API's (using Python/ Node.js/ Arduino) for Communication Protocols- MQTT, ZigBee, Bluetooth, CoAP, UDP, TCP	09	20
3	IoT Application Development: Solution framework for IoT application- Implementation of Device integration, Data acquisition and integration, Device data storage- Unstructured data storage on cloud/ local server, Authentication, authorization of devices.	18	39
4	Cloud Computing: Cloud service models – Network as a Service (NaaS), Software as a Service (SaaS), Platform as a Service(PaaS), Internet as a Service (IaaS), Public, private and hybrid cloud, OpenStack cloud architecture, IoT with cloud	05	10
5	IoT Case Studies: IoT case studies and mini project based on Industrial automation, Transportation, Agriculture, Healthcare, Home Automation	05	13

Course Outcome: After learning the course the students will be able

	CO Statement
CO-1	Explain the vision of IoT from a global context.
CO-2	Determine the Market perspective of IoT.
CO-3	Develop real life IoT based projects.
CO-4	Describe the building state of the IoT architecture.
CO-5	Apply IoT in Industrial and Commercial Building Automation and Real World Design Constraints.

List of Reference Books:

1. Vijay Madiseti, Arshdeep Bahga, Internet of Things, “A Hands on Approach”, University Press
2. Dr. SRN Reddy, Rachit Thukral and Manasi Mishra, “Introduction to Internet of Things: A practical Approach”, ETI Labs
3. Pethuru Raj and Anupama C. Raman, “The Internet of Things: Enabling Technologies, Platforms and Use Cases”, CRC Press
4. Jeeva Jose, “Internet of Things”, Khanna Publishing House, Delhi
5. Adrian McEwen, “Designing the Internet of Things”, Wiley
6. Raj Kamal, “Internet of Things: Architecture and Design”, McGraw Hill
7. Cuno Pfister, “Getting Started with the Internet of Things”, O Reilly Media

List of Suggested titles of Experiments:

1. Familiarization with Arduino/ Raspberry Pi and perform necessary software installation.
2. To interface LED/ Buzzer with Arduino/Raspberry Pi and write a program to turn ON LED for 1sec after every 2 seconds.
3. To interface Push button/ Digital Sensor (IR/LDR) with Arduino/Raspberry Pi and write a program to turn ON LED when push button is pressed or at sensor detection.
4. To interface DTH11 sensor with Arduino/Raspberry Pi and write a program to print temperature and humidity readings.
5. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed.
6. To interface OLED with Arduino/ Raspberry Pi write a program to print temperature and humidity readings.
7. To interface Bluetooth with Arduino/ Raspberry Pi write a program to send sensor data to smartphone using Bluetooth.
8. To interface Bluetooth with Arduino/ Raspberry Pi and write program to turn on LED ON/OFF when '1'/'0' is received from smartphone using Bluetooth.
9. Write a program on Arduino/ Raspberry Pi to upload temperature and humidity data to thingspeak cloud.
10. Write a program on Arduino/ Raspberry Pi to retrieve temperature and humidity data from thingspeak cloud.
11. To install MySQL database on Raspberry Pi and perform basic SQL queries.
12. Write a program on Arduino/ Raspberry Pi to publish temperature data to MQTT broker.