



FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: BACHELOR OF TECHNOLOGY (Electronics and Communication)

Semester: VII

Course Code: 202060706

Course Title: IoT and Applications

Course Group: Professional Elective Course

Course Objectives: Internet of Things (IoT) plays an important role in connecting the things i.e., variety of devices through the Internet. The IoT has emerged as a cutting-edge technology with applications in manufacturing, healthcare, Agriculture, transport, mining, smart cities and many more. This subject covers the fundamentals of IoT with its architecture, protocols and Applications. Further, it covers integration of iot devices with IoT platforms like: Arduino and Raspberry Pi.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
3	0	2	4	50/18	50/17	25/9	25/9	150/53

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction to Internet of Things: Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and OT, IoT Challenges, IoT versus M2M, CPS and WoT, Interdependence of IoT.	7
2	IoT Architecture: Drivers Behind New Network Architectures, oneM2M IoT Architecture, IoT World Forum (IoTWF) Architecture, Simplified IoT Architecture, Fog and Edge Computing.	7
3	IoT Devices: Sensors and actuators for IoT applications, IoT components and implementation, Programming of Node MCU and Raspberry PI, Implementation of IoT with Edge devices, reading sensor data and transmit to cloud, controlling devices through cloud using mobile application and web application, Types and configurations of gateways, Specifications of IoT gateways, Client-server socket programming.	7
4	IoT Protocols: Introduction to constrained nodes, networks and devices. Infrastructure Protocol, Discovery Protocol, Data Protocol, Identification and Semantic Protocol.	8



5	IoT Security and Challenges: IOT Security, Dangers, Assigning values to Information, Security Components, Key Management, Update Management, Challenges in IoT security.	8
6	IoT Applications: IoT in Agriculture, Smart irrigation system, IoT in Vehicular – Components and Advantages, Healthcare IoT, AmbuSens system, etc.	8
		45

List of Practicals / Tutorials:

1	To study an Arduino board and implement General Purpose input output using Arduino hardware and software.
2	Introduction and interfacing various sensors with Arduino.
3	Interfacing Servo motor as an Actuators with Arduino.
4	To set up raspberry pi programming environment and blinking an LED in Python on Raspberry Pi-3
5	Interfacing temperature sensor DHT-11 with Raspberry pi and uploading sensor data on thing speak cloud.
6	To demonstrate IOT application using ESP8266 Node MCU
7	Connecting Bluetooth module HC-05 with Arduino.
8	a) To implement Mosquitto MQTT Broker on Raspberry Pi. b) To control LED and switch using MQTT and Mobile App
9	a) To design smart home system to automatically detect presence of a person using PIR Sensor b) To implement relay control for home automation using NodeMCU and Blynk App
10	To detect RFID with the help of RFID Reader and Node MCU.
11	Mini Project

Reference Books:

1	Raj Kamal, Internet of Things: Architecture and Design Principles , Mc Graw Hill Education.
2	Sudip Mishra et al, Introduction to IoT , Cambridge University Press.
3	Hanes et al, IoT Fundamentals , Cisco Press
4	Vijay Madiseti and Arshdeep Bahga, Internet of Things - A Hands-on Approach , Paperback.
5	Yashwant Kanetkar, 21 Internet of Things Experiments , Kindle edition
6	Rahul Dubey, An Introduction to Internet of Things: Connecting Devices, Edge Gateway, and Cloud with Applications , Cengage India Publication.

Supplementary learning Material:

1	NPTEL Video Lectures (NPTEL online course on IoT: https://onlinecourses.nptel.ac.in/noc18_cs08)
2	Coursera Video Lectures



Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
15	15	20	15	15	20	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand IoT architecture	20
CO-2	Program Embedded IoT device and security	30
CO-3	Use IoT protocol to upload sensor data and to control devices	30
CO-4	Design IoT application and Case study.	20

Curriculum Revision:

Version:	2
Drafted on (Month-Year):	June -2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025