

S. No.	Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
								Sessional	Final Exam	Total
1	ECE-501	Internet of Things	ESC	4	3	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Explain the architecture and foundational protocols of IOT.
CO2	Develop expertise in the Arduino ecosystem for IoT applications.
CO3	Formulate IoT applications integrating appropriate components.
CO4	Assimilate data transmission, storage and management protocols for IoT applications.
CO5	Understand integration of IoT applications and the cloud.

Detailed Syllabus**Section A**

Unit 1: IoT Architecture: – Introduction, Understanding IoT fundamentals, IOT Architecture and protocols, Real-time Examples of IoT, Various Platforms for IoT, Overview of IoT components and IoT Communication Technologies, M2M and WSN Vs IOT, Recent developments and Challenges in Internet of Things.

(10 Hrs)

Unit 2: Arduino Simulation Environment: Setup the IDE, writing Arduino Software, Arduino Libraries, Embedded C programming for Arduino. Interfacing LED, push-button, buzzer and LCD with Arduino. Developing IoT Solutions: Introduction to Raspberry Pi, Raspberry Architecture and Pin Configuration, Basic Setup, Cloud Computing, Sensor-Cloud, Fog Computing, Connected Vehicles, Data Aggregation in IoT.

(12 Hrs)

Unit 3: Interfacing of Sensor & Actuators: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor with Arduino, Interfacing of Actuators with Arduino. Interfacing of Arduino with Relay switch, Servo Motor, and Communication with Electrical Machines.

(10 Hrs)**Section B**

Unit 4: Basic Networking with Wi-Fi module: Basics of Wireless Networking, Introduction to ESPXX, ESP8266, and NodeMCU. Various Wi-Fi libraries, Web server- introduction, installation, configuration, posting sensor(s) data to web server. IEEE802.15.4- BACNet Protocol, Modbus, KNX, Zigbee, Network layer, APS layer, Security.

(8 Hrs)

Unit 5: IoT Applications and Cloud Platforms: Virtualization concepts and Cloud Architecture, Cloud computing, benefits, Cloud services - SaaS, PaaS, IaaS, Cloud providers & offerings, Study of IOT Cloud platforms-ThingSpeak API and MQTT, Interfacing ESP8266 with Web services. IOT Applications for Industry: Future Factory Concepts, Brownfield IoT, Smart Applications- Wearable, Agriculture, IoT- A, Hydra, PIIoT.

(12 Hrs)**Text Books**

S. No.	Name of the Books	Author	Publisher	Edition(Pub. Yr.)
1	IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things	Hanes David, Salgueiro Gonzalo, Grossetete Patrick, Barton Rob	Cisco Press	1 st (2017)
2	Internet of Things: A Hands-on Approach	Arsheep Bagha, Vijay Madiseti	Orient Blackswan Private Limited - New Delhi	1 st (2015)
3	Internet of Things. IoT Infrastructures	Mandler, B., Barja, et all	Springer International Publication	1 st (2016)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Foundational Elements of an IOTSolution - The Edge, Cloud and Application Development	Joe Biron & Jonathan Follett	Oreilly Media, Inc	1 st (2016)
2	Internet of Things A to Z	Qusay F. Hassan	Wiley-IEEE Press	1 st (2018)
3	Internet of Things with Raspberry Pi and Arduino	Rajesh Singh, Anita Gehlot, LoviRaj Gupta, Bhupendra Singh, Mahendra Swain	CRC Press	1 st (2021)