Internet of Things

Subject: CS-335 Internet of Things

Credit hours: 3-0

Contact hours: 3 Hours (3 Lectures) per week

Text Book:

- Ammar Rayes and Samer Salam, "Internet of Things from Hype to Reality", latest Edition, Springer, 2019, ISBN 978-3-319-99515-1

- Qusay F. Hassan (Ed.), "Internet of Things: From A to Z", Latest Edition, Wiley Publishing.

- Francis daCosta and Byron Henderson, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition. Apress.

Reference Book:

- Internet of Things: Principles and Paradigms" by Rajkumar Buyya, Amir Vahid Dastjerdi, and Samar P. Garg.

- Internet of Things (A Hands-on-Approach) by Arshdeep Bahga and Vijay Madisetti.

Prerequisite: Nill

Mode of teaching: Lectures

Course description: The "Internet of Things" (IoT) course provides a comprehensive exploration of the interconnected world of IoT, covering the fundamental concepts, technologies, and applications. Students delve into the realm of smart devices, sensors, communication protocols, data processing, and analytics to understand how IoT transforms industries and daily life. Through hands-on projects and prototyping, participants gain practical experience in developing IoT applications and integrating cloud services for data storage and analysis. The course also addresses crucial aspects such as security, privacy, and ethical considerations, enabling students to grasp the challenges and opportunities of this rapidly evolving field. Ultimately, this course equips learners with the knowledge and skills to harness the power of IoT, driving innovation and addressing real-world challenges in the digital era.

Course Objectives:- The main objectives of this course are to:

- Understand the fundamental concepts and principles of the Internet of Things (IoT) and its role in the digital transformation of various industries.

- Acquire knowledge of IoT devices, sensors, and communication protocols, along with the ability to design, implement, and manage IoT applications and systems.
- Explore data acquisition, processing, and analytics techniques to derive meaningful insights from IoT-generated data, enabling informed decision-making.
- Address security, privacy, and ethical considerations related to IoT, developing skills to safeguard IoT ecosystems and ensure responsible IoT implementation.

Topics Covered:

Topic	Week No
Introduction: What is IoT, IoT Reference Framework	Week 1
Introduction: OSI Model for IoT, I2 factors Leading to IoT	Week 2
The Things in IoT: Sensors & Actuators, RFID, Video Tracking	Week 3
The Things in IoT: Wireless Networking, Wireless Sensor Networks	Week 4
IoT Requirements for Networking Protocols: Device Support, Scalability, Interoperability, Application Layer Protocol – MQTT & COAP, Network Layer Protocol – 6LoWPAN	Week 5
IoT Requirements for Networking Protocols: Routing Protocol – RPL, Service Discovery Protocol – mDNS & DNS-SD	Week 6
IoT Services Platform: Platform Functions, Platform Management, Data Management.	Week 7
IoT Services Platform: Communication Management	Week 8
IoT Services Platform: API Management	Week 9
IoT Security & Privacy Issues: Security Challenges & Requirements.	Week 10
IoT Security & Privacy Issues: Attacks & Counter Measures.	Week 11

IoT Industry Standards & Open-Source Devices & Platforms: IEEE, IETF, ITU	Week 12
IoT Industry Standards & Open-Source Devices & Platforms: ETSI, OTF, IIC	Week 13
IoT Industry Standards & Open-Source Devices & Platforms: Open Sources v/s Standards,	Week 14
IoT Industry Standards & Open-Source Devices & Platforms: Open-Source Devices & Platforms	Week 15
Social IoTs	Week 16

Course Targets:

Course Learning Outcome (CLOs)		PLOs	Learning Level
CLO 1	Investigate IoT enabling technologies, architectures, and standards	PLO 4	C2
CLO 2	Understanding of IoT protocol stack and fundamentals of Social IoTs	PLO 7	C3
CLO 3	Apply IoT knowledge to design and implement small-scale IoT based system.	PLO 3	C4