SEMESTER IV

RESEARCH SPECIFIC ELECTIVE (RSE)

Name of the Programme : M.Sc. Data Science

Course Code   : CSD-605

Title of the Course   : Internet of Things

Number of Credits   : 4(4L)

Contact Hours   : 60 hours (60L-0T-0P)

Effective from AY   : 2023-24

Prerequisites for the course	Programming knowledge	
Course Objectives:	The course objective is to identify sensor technologies for sensing real-world entities and understand the role of IoT in various domains of Industry.	
Content:	**UNIT I:** Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M. Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.	**15 hours**
	UNIT II: Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus. IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT. Edge connectivity and protocols	**15 hours**
	UNIT III: Data Handling& Analytics: Introduction, Bigdata, Types of data, Characteristics of Big data, Data handling Technologies, Flow of data, Data acquisition, Data Storage, Introduction to Hadoop. Introduction to data Analytics, Types of Data analytics, Local Analytics, Cloud analytics and applications	**15 hours**
	Unit IV: Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.	**15 hours**
Pedagogy:	lectures/ tutorials/lab assignments/self-study/ flipped classroom	
References/ Readings	1. Biron, J., & Follett, J. (2016). *Foundational elements of an iot solution*. O'Reilly Media, Incorporated. 2. Chaouchi, H. (Ed.). (2013). The internet of things: Connecting objects to the web. John Wiley & Sons. 3. Olivier Hersent, David Boswarthick, and Omar Elloumi, — "The Internet of Things: Key Applications and Protocols"	