Academic Year	: 2021-2022
Semester	: 1
Category of the Course	: Program Elective-II
Course Name & Code	: Introduction to IoT (4715908)

Prerequisite:

- Fundamentals of computer networking, sensing, databases, programming, and related technology.

Rationale:

- The course focuses on the latest machine to machine communication and the recent developments in the field of the Internet of Things.
- The course will cover the basic architecture and the protocols which are used in the companies using the IoT products.
- The course will also focus on the case study and the recent IoT applications working in the market.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
03	00	02	04	70	30	30	20	150

Course Content:

Sr No	Course Content	No of Hours	%
1	Unit I: Introduction of IoT Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components, Addressing Strategies in IoT, IoT Sensing and Actuation, IoT Processing Topologies and Types, IoT Connectivity Technologies. IoT applications.	6	15
2	Unit II: IoT Communication Technologies and Interoperability Introduction, Infrastructure Protocols, Discovery Protocols, Data Protocols, Identification Protocols, Device Management, Semantic Protocols, IoT Interoperability: Introduction, Standards and Frameworks	6	15
3	Unit III: Associated IoT Technologies Cloud Computing, Virtualization, Cloud Models, Service-Level Agreement in Cloud Computing, Cloud Implementation, Sensor-cloud: Sensor as service Fog Computing and its Application: Introduction, View of a Fog Computing Architecture, Fog Computing in IoT, Selected Applications of Fog Computing.	6	15
4	Unit IV: Domain-specific applications of IoT	6	15

	Internet of Medical Things, Home automation, Agricultural IoT, Vehicular IoT applications, Surveillance applications, Other IoT applications. Case studies of the successful implementation of IoT in organizations. Paradigms, Challenges, and the Future: Introduction, Evolution of New IoT Paradigms, Challenges associated with IoT, Emerging Pillars of IoT.		
5	Unit V: Developing IoT solutions Introduction to Python, Arduino and Raspberry Pi, Implementation of IoT with Arduino and Raspberry, Data Aggregation for the IoT in Smart Cities.	6	15
6	Unit VII: IoT Analytics Introduction of Machine Learning, Implementation of ML algorithms in the IoT application, Performance Metrics for Evaluating ML Algorithms	6	15
7	UNIT-VII: Current Trends The latest development in the cyber laws, policies and rules	4	10

Reference Book:

1. Sudip Misra, Anandarup Mukherjee, Arijit Roy, "Introduction to IoT", 1st Edition, Cambridge University Press, 2021.
2. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on- Approach)", 1st Edition, VPT, 2014
3. Cuno Pfister, Getting Started with the Internet of Things, O" Reilly Media, 2011, ISBN: 978-1-4493- 9357

Course Outcome:

After completion of the Course, Students will be able to:

No	Course Outcomes	RBT Level*
01	Understand the basic terminologies in the Internet of Things.	U
02	Differentiate the protocols based on the IoT communication model.	AP
03	Analyze the security and privacy issues in IoT environment about cloud computing and Fog Computing	AN
04	Evaluate the different use cases for the implementation of IoT in Industries.	EL
05	Create IoT based solutions using IoT analytics, IoT kit/ Arduino/ Raspberry Pi, sensors, actuators and Devices	CR

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List:

- The practical work will be carried out based on the content covered during the academic sessions.

List of Laboratory/Learning Resources Required:

- Course-related online MOOCs on NPTEL/SWAYAM platform
- https://onlinecourses.nptel.ac.in/noc20_cs66/preview
- Recently Published papers/articles in reputed journals
- Hardware Tools: Raspberry pi, Arduino, IoT kit.
- Software: Node-Red Simulator, Contiki OS, Eclipse IoT Project, M2MLabs Mainspring.