19CSE446	INTERNET OF THINGS	L-T-P-C: 2-0-3-3

Pre-Requisite(s):19CSE102 Computer Programming, 19CSE303 Embedded Systems

Course Objectives

- This course covers the fundamentals of IoT and provides skills for IoT based product development.
- The skills students learn in this subject include the selection of sensors, protocols, hardware boards, interfacing, and implementation for product building. Real life case studies are introduced in this course.

Course Outcomes

CO1: Understand the key techniques and theory behind Internet of Things.
CO2: Apply effectively the various enabling technologies (both hardware and software) for IoT.
CO3: Understand the integration of Cloud and IoT , Edge and Fog Computing.
CO4: Apply various techniques for Data Accumulation, Storage and Analytics.
CO5: Design and build IoT system for any one interesting Use case

CO-PO Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2									2	2	3	2
CO2	3	3	2	2	3		3	2	2	2	2	2	3	2
CO3	3	3	2	3	3	2	3	2	2	2	2	2	3	2
CO4	3	3	2	3	3	2	3	2	2	2	2	2	3	2
CO5	3	3	2	3	3	2	3	2	2	2	2	2	3	2

Syllabus

Unit 1
Introduction to loT - loT definition - Characteristics - Things in loT - loT Complete Architectural Stack - loT enabling Technologies - loT Challenges - loT Levels - A Case Study to realize the stack. Sensors and Hardware for loT - Accelerometer, Proximity Sensor, lR sensor, Gas Sensor, Temperature Sensor, Chemical Sensor, Motion Detection Sensor. Hardware Kits - Arduino, Raspberry Pi, Node MCU. A Case study with any one of the boards and data acquisition from sensors.

Unit 2
Protocols for loT - infrastructure protocol IPV4/V6|RPL), Identification (URLs), Transport (WiFi, LiFi, BLE), Discovery, Data Protocols, Device Management Protocols. - A Case Study with MQTT/CoAP usage. Cloud and Data analytics- Types of Cloud - loT with cloud challenges - Selection of cloud for loT applications - Fog computing for loT - Edge computing for loT - Cloud security aspects for loT applications - RFM for Data Analytics - Case study with AWS / AZURE / Adafruit / IBM Bluemix.

Unit 3
Case studies with architectural analysis: loT applications - Smart City - Smart Water - Smart Agriculture - Smart Energy - Smart Healthcare - Smart Transportation - Smart Retail -Smart waste management.

Text Book(s)

Bahga A, Madisetti V. Internet of Things: A hands-on approach; 2014.

Reference(s)

Shriram K Vasudevan, Abhishek SN and Sundaram RMD. Internet of Things, First Edition,Wiley India;2019.
Raj P, Raman AC. The Internet of things: Enabling Technologies, Platforms, and Use-cases. Auerbach Publications; 2017.
Adrian McEwen. Designing the Internet of Things, Wiley;2013.

Evaluation Pattern

Assessment	Internal	External
Periodical 1	10	
Periodical 2	10	
*Continuous Assessment (Theory) (CAT)	10	
Continuous Assessment (Lab) (CAL)	40	
End Semester		30

*CA – Can be Quizzes, Assignment, Projects, and Reports.