GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3173215
IOT and its Applications
7th Semester

Type of course: Open Elective

Prerequisite: C Programming**,** Microprocessor, Networking

Rationale: Internet of Things plays an important role in connecting the things i.e. variety of devices through the Internet. The IoT has emerged as an cutting-edge technology with applications in manufacturing, healthcare, Agriculture, transport, mining, smart cities and many more. This subject covers the fundamentals of IoT with its architecture, protocols and Applications. It also covers the overview and programming of two widely used IoT platforms Arduino and Raspberry Pi.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M) PA	ESE (V) ESE	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr No	Course content	Total Hrs
1	**Introduction to Internet of Things:** Application areas of IoT, Characteristics of IoT, Things in IoT, IoT stack, Enabling technologies, IoT challenges, IoT levels, IoT and cyber physical system, IoT and WSN	**04**
2	**Sensors, Microcontrollers, and Their Interfacing:** Sensor interfacing, Types of sensors, Controlling sensors, Microcontrollers, ARM	**04**
3	**Protocols for IoT :** Messaging protocols, Transport protocols, IPv4, IPv6, URI	**06**
4	**Cloud for IoT:** IoT and cloud, Fog computing, Security in cloud, Case study	**04**
5	**Application Building with IoT:** Various application of IoT : Food, Healthcare, Lavatory maintenance, Water quality, Warehouse, Retail, Driver Assistance, Collision impact	**04**
6	**Arduino and Raspberry Pi:** Arduino : Architecture, Programming and Application Raspberry Pi : Architecture, Programming and Application	**06**
7	**IoT Security:** Various security issues and need, architecture, requirement, challenges and algorithms	**02**

Reference Books:

1. Internet of Things, Vasudevan, Nagrajan and Sundaram, Wiley India
2. IoT Fundamentals, David Hence at el, Cisco Press
3. 21 IoT Experiments, Yashavant Kanetkar, Shrirang Korde, BPB
4. IoT Based Projects, Rajesh Singh at el, BPB
5. Internet of Things with ARDUINO and BOLT, Ashwin Pajankar, BPB
6. Star Expert IoT Specialist, STAR CERTIFICATION

Course Outcomes: Students should able to

Sr. No.	CO statement	Weightage
CO-1	Demonstrate the architecture and functioning of IoT systems including the sensors and microcontrollers with their interfacing and software need considering application areas.	20
CO-2	Diagnose the various IoT protocols with detailing of their elements and overall functioning within IoT systems for efficient communication.	20
CO-3	Design an IoT system to take the benefit of the Clouds for computing and storage considering security issues.	20
CO-4	Leverage the benefits of IoT technologies for automating the various real-life challenges in various application areas.	20
CO-5	Develop the software components of IoT system using Arduino/Raspberry Pi Programming.	20

List of Practical:

Practical should be performed by students based on
- Using Arduino or Raspberry Ri boards and its software platforms

List of Open Source Software/learning website:

1. https://www.tutorialspoint.com/internet_of_things/index.htm
2. https://www.iotworldtoday.com/
3. https://aws.amazon.com/iot/
4. https://www.cisco.com/c/en_in/solutions/internet-of-things/overview.html
5. https://www.cisco.com/c/en_in/solutions/internet-of-things/iot-network-connectivity.html