



GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc), 5th Semester
Branch: Software Development
Subject Name: Internet of Things
Subject Code: 21150203

Type of course: Core

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 a 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
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr. No.	Content	Teaching Hrs.	Module % Weightage
1.	Introduction to IOT Understanding IoT fundamentals, IOT Architecture and protocols, Various Platforms for IoT, Real time Examples of IoT, Overview of IoT components and IoT Communication Technologies, Challenges in IOT	08	20
2.	Arduino Simulation Environment Arduino Uno Architecture, Setup the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push button	04	20
3.	Sensor and Actuators with Arduino Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor with Arduino, Interfacing of Actuators with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino	12	20
4.	Basic Networking with ESP8266 Wi Fi module Basics of Wireless Networking, Introduction to ESP8266 Wi-Fi Module, Various Wi-Fi library, Web server-introduction, installation, configuration, Posting sensor(s) data to web server	10	20
5	Cloud Platforms for IOT Virtualization concepts and Cloud Architecture, Cloud computing, benefits, Cloud services -- SaaS, PaaS, IaaS, Cloud providers & offerings, Study of IOT Cloud	08	20



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	platforms, Thing Speak API and MQTT, Interfacing ESP8266 with Web services.		
	Total	42	100

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.

Suggested Specification Table with Marks (Theory): (For BVOC only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	20	0	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate
C: Create and above Levels (Revised Bloom's Taxonomy)

Course Outcomes:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Understand the concepts of IoT.	20
CO-2	Understand concepts of Arduino Simulation Environment.	20
CO-3	Understand concepts of Sensor and Actuators with Arduino.	20
CO-4	Understand concepts of Basic Networking with ESP8266 Wi-Fi module.	20
CO-5	Understand concepts of Cloud Platforms for IOT.	20

List of Open Source Software/learning website:

Students must refer to following sites to enhance their learning ability.

- https://www.tutorialspoint.com/internet_of_things/index.htm
- <https://www.iotworldtoday.com/>
- <https://aws.amazon.com/iot/>
- https://www.cisco.com/c/en_in/solutions/internet-of-things/overview.html
- https://www.cisco.com/c/en_in/solutions/internet-of-things/iot-network_connectivity.html