GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3163212

IT INFRASTRUCTURE AND UTILITIES
6th SEMESTER

Type of course: Undergraduate (Elective)

Prerequisite: NA

Rationale: Obtaining efficient IT Infrastructure is very important in modern scenario as the world want all the resources shared and analyzed online. This course enables to understand and analyze the IT infrastructure technology and equipment's required for Smart Infrastructure.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr No	Course content	Total Hrs	%Weightage
1	**Introduction and Technology for Smart Infrastructure:** System Software and Service Architecture Terminology: RTOS concepts and definitions, real-time design issues. Smart grids. Introduction to sensors, Types of Sensors, Moisture sensor, tilt sensor, smoke sensor, Temperature Sensor, Pressure Sensor, Level Sensor Fibre Optic Sensors, Acoustic Sensors etc.	**06**	**20%**
2	**Introduction to IOT** Overview of IOT concepts, IOT Standards, Components of IOT System, Relevance of IOT for the future, IOT Applications, The role of Artificial Intelligence in Internet of Things with applications, Challenges in IOT implementation: Device Level Energy Issues, Recommendations on Research Topics.	**10**	**25%**
3	**AR-VR Technology** Basics of Augmented Reality and Virtual Reality**,** History and differences between Augmented and Virtual Reality. Input devices – controllers, motion trackers and motion capture technologies for tracking, navigation and gestural control. Output devices – Head Mounted VR Displays, Augmented and Mixed reality glasses AR applications in navigation, Search Engine, etc. Application of VR in Digital Entertainment.	**10**	**25%**

4	**Data Center Infrastructure** Data Center Architecture, Data Center Design Models: Three-Tier and Multi-Tier Models. IT Equipment, Power backup, Maintenance, Recovery, Security, Performance analysis of architectures. Case Study: The Cisco Virtualized Multi-tenant Data Center CVD	**8**	**20%**
5	**Computer Applications in infrastructure development (Case Studies)** Smart Energy Meter, Wearable Devices, Smart Traffic System, Smart Home Automation, Smart Security Surveillance, Smart Sanitation Smart Public Safety, Smart water management, IOT in Indian Scenario: Aadhaar	**8**	**10%**

Suggested Specification table with Marks (Theory):70

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**30**	**10**	**10**	**5**	**5**

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

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Dr Mani N, Smart Cities & Urban Development in India, New Century Publications, 2016
2. Mehmood, R., See, C.W.S., Katib, I., Chlamtac, I., Smart Infrastructure and Applications, EAI/Springer Innovations in Communication and Computing, 2020
3. Cuno Pfister , Getting Started with the Internet of Things: Connecting Sensors and Microcontrollers to the Cloud, Maker Media, Inc., 17-May-2011
4. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press, 2003/2006.
5. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013.

Course Outcome:

After learning the course the students should be able to:

Sr. No.	**CO Statement**	**Marks % Weightage**
CO-1	Know the details of equipment's required for creating smart infrastructures	30
CO-2	Understand the IOT architecture	25
CO-3	Understand the importance and applications of Augmented and Virtual Reality Systems	25
CO-4	Know the IT requirement for creating data centers	20