GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3174028
Semester – VII
Subject Name: ICT for Infrastructure Engineering

Type of course: Open Elective

Prerequisite: Basic operational understanding of computer system

Rationale:.

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.	Content	Total Hrs
1	**Unit I: Basics of IT Infrastructure** Introduction: Living in a Network Centered World, Components & types of IT infrastructures. Network Topology: Star, Ring, Mesh, etc, Review of TCP/IP protocol suite and architecture. Basics of Wired and Wireless LAN/MAN and WAN technologies. IP addressing, Class A, Class B and Class C addresses, Subnet, Proxy, OSI layer, Basics of Layered Protocol, Firewall and its importance. Wireless Sensor networks: Introduction, Types of wireless sensor networks, WSN Network Topologies, Issues in WSN: Energy Consumption and Security.	12
2	**Unit II: Tracking Systems: RFID and Global Navigation Satellite System** RFID and wireless sensor networks, RFID technology, architecture and protocols, RFID applications for the enterprise, RFID problems and concerns. GPS: GPS System Description, Overview and terminology, Principles of operation, Augmentation, Trilateration, Performance overview, Modernization. GPS Policy and Context, Condensed navigation system history, GPS policy and governance. Other satellite navigation systems. GPS Applications- Land, Marine, Aviation, Science.	10
3	**Unit III: Internet of Things** 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	6
4	**Unit IV: Smart Infrastructure and User Experience** Types of Sensors, How sensor works?, Moisture sensor, tilt sensor, smoke sensor, Temperature Sensor, Pressure Sensor, Level Sensor Fibre Optic Sensors etc, Concept of Smart Home, Smart Meter, Smart Mobility, Smart Public Safety, Smart Sanitation, Smart	10

	Security and Surveillance. Basics of Augmented Reality and Virtual Reality, AR in navigation, AR in Search Engine, etc.	
5	**Unit IV: Computer Applications in infrastructure development** Case Study: IOT in Indian Scenario: Aadhaar	**4**
	Total	**42**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
35	**45**	**10**	**10**	**-**	**-**

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. Behrouz A. Forouzan, TCP/IP Protocol Suite
2. Andrew Tanenbaum, Computer Networks, 5th Edition, Pearson Education.
3. Hofmann-Wellenhof, B., H. Lichtenegger, and J. Collins. GPS Theory and Practice. Springer, 1994. ISBN: 9780387824772.

Course Outcomes: After studying this subject, students will be able to

Sr. No.	CO statement	Marks % weightage
CO-1	Understand the basics of Information and communication technology.	30%
CO-2	Explore the applications of ICT for infrastructure	30%
CO-3	Analyze and exploit the merits of ICT to establish more effective infrastructure	25%
CO-4	Explore emerging trends and technologies of IoT, Augmented and Virtual reality for better infrastructure for societal benefits.	15%