

# GUJARAT TECHNOLOGICAL UNIVERSITY

## ELECTRONICS & COMMUNICATION (WIRELESS COMMUNICATION TECHNOLOGY) (44)

TELECOMMUNICATION SWITCHING AND NETWORKS

SUBJECT CODE: 2714406

SEMESTER: I

**Type of course:** Major Elective-I

**Prerequisite:** Electromechanical and electronic system direct and common control systems direct and common control systems. Fundamental knowledge of public switched telephone network (PSTN) and public data network (PDN). Analytical and mathematical knowledge

**Rationale:** ME students of EC Engineering need to have good understanding of the fundamentals and application of telecommunication networks i.e. PSTN, PDN and ISDN i.e. the process of total digitalization of telecommunication networks. They will be able to understand recent topics like time division switching systems, data networks, ISDN, voice data integration and fiber optic communication systems and networks

### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	PA (V)		PA (I)			
					ESE	OEP	PA	RP		
4	2	2	6	70	30	20	10	20	0	150

### Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	<b>Introduction:</b> Evolution of Telecommunications, Simple Telephone Communication, Manual switching system, major telecommunication network.	3	7
2	<b>Electronic Space Division Switching:</b> Stored Program Control, Centralised SPC, Distributed SPC, Enhanced Services, Two stage networks, Three stage network.n-stge networks.	5	11
3	Time multiplexed Space Switching, Time Multiplexed time switching, combination Switching, Three stage combination switching, n-stage combination switching.	5	11
4	<b>Optical Fibre Systems:</b> Types of optical Fibres, Fibre Optic Transmission, Optical Sources, optical Detectors, Power budget analysis, Telecommunication applications	4	9
5	<b>Traffic Engineering:</b> Network Traffic load and parameters, Grade of service and blocking probability, Modelling Switching Systems, Incoming Traffic and Service Time Characterisation, Blocking Models and Loss Estimates, Delay systems.	4	9
6	<b>Telephone Networks:</b> Subscriber Loop Systems, Switching Hierarchy and Routing, Transmission Plan, Transmission Systems, Numbering Plan, Charging Plan, Signalling Techniques, Inchannel signalling, common channel	5	11

	signalling, Cellular mobile telephony.		
7	<b>Data networks:</b> Data transmission in PSTNs, Switching Techniques for data Transmission, Data communication Architecture, Link to Link Layers, End to End layers, Satellite based data networks, LAN, Metropolitan Area network, Fiber optic networks, and Data network standards.	5	11
8	<b>Integrated Services Digital Networks:</b> Motivation for ISDN, New services, Network and Protocol architecture, Transmission Channels, User Network Interface, signalling, Numbering and Addressing, Service characterisation, Interworking, ISDN standards, Broadband ISDN, Voice data Integration.	6	13
9	<b>Network Management Tools:</b> Tools catalog, Basic software Tools, Traffic monitoring tools,	2	4
10	<b>SNMP:</b> SNMP management, major changes in SNMP, SNMP system architecture, SNMP structure of management information	4	9
11	<b>Remote Monitoring:</b> RMON SMI and MIB, RMON1 Textual Conventions	2	5

#### Reference Books:

1. T Viswanathan , Telecommunication switching systems and networks. PHI
2. Johan C. Bellamy , Digital Telephony , 3rd edition, John Wiley and Sons
3. Mani Subramanian, Network Management

#### Course Outcome:

1. To analyze fiber optic communication system which are emerging as a major alternative to co-axial systems?
2. To implement the practical application of fiber optic communication system in telecommunication networks.
3. To design loss systems, delay systems models.
4. To compare telephone network, data network and integrated service digital network

#### List of Experiments:

Based on syllabus

#### Open Ended Problems:

1. MATLAB implementation to find blocking probability of a two stage and three stage network.
2. MATLAB implementation to find availability and non-availability of single processor and dual processor.
3. MATLAB implementation to find traffic carried per server and group of servers

**Major Equipments :** Matlab

**Learning website:** [www.nptel.ac.in](http://www.nptel.ac.in)