GUJARAT TECHNOLOGICAL UNIVERSITY

ELECTRONICS & COMMUNICATION (COMMUNICATION SYSTEMS ENGG) (04)
TELECOM SWITCHING SYSTEM, NETWORKS AND NETWORK MANAGEMENT
SUBJECT CODE: 2710430
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	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	0	2	4	70	30	20	10	20	0	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Introduction:** Evolution of Telecommunications, Simple Telephone Communication, Manual switching system, major telecommunication network.	3	7
2	**Electronic Space Division Switching:** 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	**Optical Fibre Systems:** Types of optical Fibres, Fibre Optic Transmission, Optical Sources, optical Detectors, Power budget analysis, Telecommunication applications	4	9
5	**Traffic Engineering:** 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	**Telephone Networks:** Subscriber Loop Systems, Switching Hierarchy and Routing, Transmission Plan, Transmission Systems, Numbering Plan, Charging	5	11

	Plan, Signalling Techniques,Inchannel signalling, common channel signalling, Cellular mobile telephony		
7	**Data networks:** Data transmission in PSTNs, Switching Techniques for data Transmission, Data communication Architectrcture, Link to Link Layers, End to End layers, Satellite based data netwoks, LAN, Metropolitan Area network, Fiber optic networks, and Data network standards.	5	11
8	**Integrated Services Digital Networks:** 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	**Network Management Tools:** Tools catalog,Basic software Tools, Traffic monitoring tools	2	4
10	**SNMP:** SNMP management, major changes in SNMP,SNMP system architecture,SNMP structure of management information	4	9
11	**Remote Monitoring:** 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:
By the end of this course, the student should be able to do the followings
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.
4. Design optimum resonator with best values of operating frequency and quality factor.

Software: Matlab

Learning website: www.nptel.ac.in