

5138 – DATA COMMUNICATIONS										
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)					
Lectures	Practical	Credits			Theory		Practical Ex.		Total	
3	2	5	25	25	3 Hrs	100	50		200	
Pre-requisite		Source	U	Semester	Theory	Test	Total	TW	PR	Gr Total
Nil		EXC			75	25	100	25	50	175

COURSE CONTENTS										Hrs	Mks
1. OPTICAL FIBER COMMUNICATION SYSTEM										17	33
Need for optical communication. Frequencies used. Advantages of optical communication. Block diagram of an optical communication system. Applications of optical fiber communication. Optical Fiber – Mechanism of signal transmission through fiber. Fiber fabrication method – core and cladding structure. Types of fibers – step index and graded index. Multimode propagation. Materials used. Fiber coupling – joints, connectors and splicers. Signal attenuation and distortion. Optical sources – LED and LASER diode – construction, principle of operation and comparison. Modulation techniques used. Photo detectors – Photo diode, PIN photo detector and Avalanche photo-diode – construction and principle of operation.											
2. DATA COMMUNICATION										18	37
Serial & parallel, synchronous & asynchronous & simplex and duplex communication. Data communication components – MODEMS - their classification and operation. Serial communication protocols. Definition of and need for protocols. BISYNC Protocol and their use of 8251 for BISYNC communication. High level data link control protocol. ISO Model for computer – computer communication. Communication network – Need and uses of networks. Concept of network nodes. Network topologies – star, mesh, ring and bus topology. Circuit switching and packet switching. Local area network and implementation through ethernet and arcnet											
3. SATELLITE COMMUNICATION										13	30
Principles of satellite communication. Uplink and downlink frequencies. Active and passive satellites. Typical configuration spacecraft. Earth station – Block diagram of earth station. Description of functions and components of various sub-systems. Multiple access techniques. Block diagram study of various access techniques such as FDMA, TDMA, SSMA/CDMA. Comparison of these techniques. Application of satellite communication systems – Domestic satellite system, INSAT system & international system INTELSAT/INMARSAT.											
Total										48	100

List of Laboratory Experiments	No. of turns
1. Fiber optic link (analog and digital)	02
2. Study of optical fiber	02
3. Serial transmission using SID line of 8085 and interfacing lcs	01
4. Study of modems	02
5. Study of LAN systems.	02
6. Field visits to microwave stations	02

Time Division Switching: Concept of analog and digital time division switching. Block diagram and operation of a time division space switch. Control techniques of a time division space switch.- Input controlled, Output controlled, Memory controlled. Block diagram & operation of a basic time division time switch. Control techniques of a time division time switch.- Sequential write/random read, Random write/sequential read, Random input/random output. Block diagram and operation of a basic time multiplexed space switch. Concept of a time multiplexed time switch.	16	24
2. PAGING SYSTEMS	08	12
Introduction and overview of a paging system. Block diagram and working of a paging transmitter and receiver unit (pager). Merits and limitations of a paging system.		
3. CONVENTIONAL MOBILE TELEPHONE SYSTEM	08	12
Concept of a mobile telephone system. Description of the process of establishing a call. Advantage of mobile telephony over line telephony. Comparison with pagers.		
4. CELLULAR COMMUNICATION	20	36
Concept of a cellular switching system: Cell splitting technique, Frequency reuse. Description of the following components of a cellular system.- Cell site (base station), Mobile telephone switching office (MTSO), Cellular handset (mobile receiver) Description of the following processes in a cellular system – Log-on (initialisation), Monitoring, Receiving calls (incoming), Sending calls (outgoing), Handoff. Comparison of a cellular system with a conventional mobile telephone system. Channel types and their functions. Allocation of frequencies. Routing of cellular calls: Mobile – to – landline calling, Landline – to – mobile calling, Cellular – to – cellular calling. Antennas: Cell site antennas, Discone antenna (umbrella pattern), Minimum separation of cell-site receiving antennas, Mobile antennas, Roof mounted antennas, Mobile high-gain antennas. Global system for mobile (GSM): Subsystems of GSM, Mobile station, Base station, Network and switching subsystems (block diagram), Operation subsystems (block diagram), GSM channels and channel modes. Health hazards of a cellular system.		
TOTAL	64	100

FIELDS VISITS:

1. Visit to an Electronics exchange.
2. Study of an EPABX
3. Visit to a mobile/cellular exchange.
4. Study of a pager (receiver) and a cellular handset (phone).

REFERENCE BOOKS:

1. Telecommunication Switching Systems and Networks by Thiagarajan Vishwanathan
2. Wireless Networked Communications by Bud Bates.
3. Mobile Cellular Telecommunications by William Lee
4. Modern Electronic Communication by Gary Miller.
5. Telecommunication Transmission Systems by Robert Winch.
6. Wireless Personal Communications by Ron Schneiderman
7. Electronic Communications Handbook by Andrew Inglis

