Data Communications				
	3	1	0	Mathematics, Physics

Course Objective: 1. To understand various key components for data communication systems.
2.To familiarize with the mathematical and physical principles of digital transmission techniques.
3. To understand and differentiate among various data communication techniques and devices.

S. NO.	Course Outcomes (CO)
CO1	Understand the fundamental concepts and application of data communications
CO2	Develop a comprehensive understanding of fundamental data communication concepts, digital transmission techniques,data representation, synchronization and multiplexing.
CO3	Acquaint the principles of modulation process for different digital modulation systems.
CO4	Learn to evaluate working of waveform coding techniques and analyse their performance
CO5	Develop the understanding of design issues of digital communication channels, switching systems and devices

S. NO.	Contents	Contact Hours

UNIT 1	Introduction to Data Communication: Definition, Characteristics & Components of Data Communication System. Data Representation, types of Communication and data transmission modes. Synchronous and Asynchronous Transmission. Communication model, Sender, Receiver, Carrier and data flow.	**10**
UNIT 2	Data and signals : Analog and Digital data & signals. Periodic and nonperiodic signals. Phase, wavelength, time and frequency domains.Concept of bandwidth. Bit rate, bit length, transmission of digital signals. Impairments, attenuation, distortion, noise. Data rate limits, bandwidth, throughput, latency (delay), bandwidth-delay product & jitter.	**10**
UNIT 3	Digital Transmission: Analog to digital and digital to digital conversion .Line Coding, Line Coding Schemes, Block Coding, Scrambling. Digital Modulataion techniques , Pulse Code Modulation (PCM) and Delta Modulation (DM). Parallel and Serial Transmission, Bandwidth Utilization-Multiplexing and Spreading:	**10**
UNIT 4	Transmission media & Physical layer: Guided media: twisted-pair cable, coaxial cable, fiber-optic cable. Unguided media-wireless: radio waves, microwaves infrared. Performance comparison of Wired and Wireless Media. Physical Layer Specifications, Signaling, and network devices at Physical Layer	**8**
UNIT 5	Introduction of Switching Networks: Switching Methods and devices, access points, hubs , routers , gateways. Comparison of, Circuit, Packet Switching datagram and Virtual circuit switching . Structure of Switch.	**4**
	TOTAL	**42**