

Course Title	Data Communications	
Course Code	IT301	
Course Credit	Lecture	: 03
	Practical	: 01
	Tutorial	: 00
	Total	: 04
Course Learning Outcomes		
<p>At the end of the course, students will be able to:</p> <ul style="list-style-type: none"> • Understand Basics of Data communication and signal. • Understand basics of analog and digital transmissions. • Understand data/signal transmission over transmission medium • Analyze multiplexing and switching techniques • Understand the data transfer in telephone and modems. • Apply various error correction and error detection techniques. • Apply concepts of data communication to solve various related problems. 		
Detailed Syllabus		
Sr. No.	Name of chapter & details	Hours Allotted
Section – I		
1	Data Communication Fundamentals Introduction to data communications, Layered Tasks, Network models: OSI reference model, TCP/IP, Applications of Network.	04
2	Basics of Data and Signal Introduction to Data and Signal, Analog and digital signals, Periodic and Non periodic Signals, Amplitude, phase, wavelength, bandwidth, bit rate, bit length, Transmission Impairments: attenuation, distortion, noise. Basic idea of Data Rate Limits: Nyquist and Shannon's Criteria. Performance: Throughput, Latency, Bandwidth-delay product, Jitter.	06
3	Digital Transmission Digital to digital conversion, Analog to Digital conversion, Transmission Modes	05

4	<p>Analog Transmission Digital to analog conversion: aspects of digital to analog conversion, Amplitude shift keying, Frequency shift keying, Quadrature Amplitude Modulation. Analog to analog conversion: Amplitude and Frequency Modulation, Phase Modulation</p>	04
5	<p>Transmission Media Guided Media: Twisted Pair Cable, Coaxial Cable, Fiber Optics Unguided Media: Radio waves, Microwaves and Infrared</p>	05
Section – II		
6	<p>Multiplexing Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Wavelength Division Multiplexing</p>	04
7	<p>Switching Circuit-switching, Packet Switching and Virtual Circuits.</p>	04
8	<p>Telephone Network and Modem Telephone Network, Dial-Up Modems, Digital Subscriber Line: ADSL, ADSL Lite, HDSL, SDSL, VDSL.</p>	04
9	<p>Error Detection and Error Correction: Error Correction and Detection: Introduction, Block Coding, Linear Block Codes, Cyclic Codes, Checksum, Hamming Codes.</p>	06
10	<p>Data Link Control Framing, Flow Control and error control, Protocols for Noiseless and Noisy Channels, HDLC, Point-to-Point Protocol</p>	06
Instructional Method and Pedagogy		
<ul style="list-style-type: none"> • Lectures will be conducted using Multimedia software, Virtual reality, black-board, video and audio technologies. • Drill-and-practice, Tutorial, simulation, self-learning modules and problem solving will be used for student motivation. • Computer Managed and Computer Assisted Instructions will be used inside the class-room 		
Reference Books		

- Behrouz A Forouzan, Data Communication and Networking, Fourth Edition, TMH
- Andrew S Tannenbaum, Computer Networks, Fourth Edition, PHI.
- Behrouz A Forouzan, TCP/IP Protocol Suite, Third Edition, TMH.
- Peterson & Davie, Computer Networks – A systems approach, Third Edition, Morgan Kaufmann
- Ross & Kurose, Computer Networking: A top-down approach, Third Edition Pearson Education
- Keshav, An engineering approach to computer networking, First Edition, Pearson Education.

Additional Resources

- NPTEL Lecture slides of Computer Networks course of Computer Science & Engineering by Prof. Ajit Pal, Indian Institute of Technology, Kharagpur - [Available at: <http://nptel.ac.in/courses/106105080/>]
- NPTEL Video lectures of Computer Networks course of Computer Science & Engineering by Prof. Sujoy Ghosh, Indian Institute of Technology, Kharagpur - [Available at: <http://nptel.ac.in/courses/106105081/>]
- NPTEL Lecture Slides of Computer Networks course of Computer Science & Engineering by Prof. Hema Murthy, Indian Institute of Technology, Madras - [Available at: <http://nptel.ac.in/courses/106106091/>]