

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0502
Course Title:	Digital Communications
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
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Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. explain data/signal transmission over communication medium
2. apply concepts of data communication to solve various problem
3. analyze various spread spectrum, multiplexing, and modulation techniques
4. choose appropriate guided or unguided modes of transmission based on specific needs

Syllabus:

Total Teaching hours: 20

Unit	Syllabus	Teaching hours
Unit-I	Introduction to Data Communication: components of network, its types and topology, protocol. Network models: OSI reference model, TCP/IP protocol suite, Applications of data communications Data Communications and Networking for Today's Enterprise	03
Unit-II	Data and Signal: types of Analog and digital signals and its characteristics, transmission of digital signal, data rate limits, signals in time and frequency domain, transmission impairment, performance measurement of network	03
Unit-III	Digital Transmission: digital to digital and Analog to digital conversion, transmission modes, Analog transmission: Digital to analog and analog to analog conversion	05
Unit-IV	Multiplexing and Spread Spectrum Techniques, Spread Spectrum Techniques	03
Unit-V	Types of Errors: detection versus correction, coding, block coding, cyclic codes, checksum, forward error correction.	04
Unit-VI	Transmission Media: Guided media and unguided media: radio frequency allocation, frequency reuse	02

Self-Study: The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings/
References:

1. Behrouz Forouzan, Introduction to Data Communication and Networking, Tata McGraw Hill
2. William Stallings, Data and Computer Communication, PHI
3. Schweber W.L, Data Communication, Tata McGraw Hill
4. Andrew S Tanenbaum, Computer Networks, PHI
5. B.P. Lathi, Zhi Ding, Modern Digital and Analog Communication, Oxford University Press

Suggested List of
Experiments:

Sr. No.	Title	Hours
1	To identify various networking components with applicability like connectors, cables, NIC, interconnecting devices etc.	02
2	To simulation different network topologies and perform comparative study of each. (Using CISCO Packet Tracer). Determine which topology will be suitable for which applications?	02
3	To perform hands on practice of signals and their properties in Scilab/Matlab.	04
4	To implement and analyse various Line Coding Schemes. To Implement unipolar NRZ-L, NRZ-I and polar Manchester, Differential Manchester and AMI/Pseudo-ternary. To Compare the schemes for parameter synchronization, DC component and bandwidth.	04
5	To implement analog modulation techniques (using Scilab/Matlab)	02
6	To implement Pulse Code Modulation	02
7	To implement Synchronous Time Division Multiplexing technique	02
8*	To implement Cyclic Redundancy Check (CRC) error detection algorithm for Noisy channel	02
9*	To implement Error Correcting Code.	
10*	To perform real time simulation of modulated signal transmission and reception.	

Note: Marked with * are additional

Suggested Case List:

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