Department of Liberal Education
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	**B.A. / B.Sc. (LIBERAL EDUCATION)**			**Year/ Semester:**	**3rd / 6th**
Course Name	**Data Communication and Networking**	**Course Code:**	**CS306**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**50 Marks**		**End Term Exam:**	**50 Marks**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	1. Build an understanding of the fundamental concepts of Data communication. Familiarize the student with the basic taxonomy and terminology of signals. 2. To learn about the Modulation and Data Encoding methods. To study about the Multiplexing Techniques and different switching technique. 3. Get knowledge about the Network and its application. Study about the different Network Topologies. 4. To understand the concepts of TCP/IP protocol suite. Build an understanding of the various data link layer protocol and its applications.				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
Course Outcome (CO)	**Attributes**				
CO1	Independently understand basic computer network technology.				
CO2	Understand and explain the Data Communications System and its components.				
CO3	Identify the different types of network topologies and protocols.				
CO4	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	Mid-term Examination: 20 Marks Activity: 10 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks				
Session Details	**Topic**			**Hours**	**Mapped CO**
Unit 1	**Data Communication:** Introduction, Communication Systems, Components of Data Communication, Types of Data: Analog and Digital, Types of Signals: Analog and Digital, types of Data Communication, Simplex, Half Duplex, Full Duplex, Communication Channel, Guided and Unguided Media Channel, Data Transmission Modes, Serial Transmission and Parallel Transmission Model, Bit Rate and Baud Rate. **Computer Network:** Local Area Network, Metropolitan Area Network, Wide Area Network, Protocol.			15	CO1

	Activity: • Graphical representation of various computer networks.		
Unit 2	**Data Modulation and Data Encoding:** Concept of Modulation, types of Modulations, need for modulation, Analog data Analog signal, Analog data Digital Signal, Digital data Analog Signal, Digital data Digital Signal. **Introduction to Multiplexing:** Frequency Division Multiplexing, Time Division Multiplexing, Wavelength Division Multiplexing, **Switching Techniques:** Circuit Switching and Packet switching, Message Switching Techniques. **Activity:** • Comparative analysis of modulation techniques.	15	CO2
Unit 3	**Networking:** An overview, criteria for good network goals, application of networks, Types of computer network architecture, **Network Structure Services:** Datagram, Virtual circuit, Connectionless and Connection-Oriented Communication. **Network Topologies:** Bus, Ring, Star, Tree and Mesh Topologies. **OSI Model:** Introduction to ISO-OSI reference model and its layers, Network architectures, protocol hierarchy and layering concepts. OSI Terminology: Interface, Protocol, Service primitives. **Activity:** • Graphical representation of network topologies.	15	CO3
Unit 4	**TCP/IP Suite:** Introduction to TCP/IP protocol, Brief overview of TELNET, FTP, TFTP, SMTP, NFS, SNMP, DNS. **Data Link Layer Design Issues:** Services provided to Network layer, Error control features & review of techniques, **Flow Control:** Elementary Data Link Protocol, Noiseless Channels, Simplex, Stop & Wait, Noisy Channels, Stop & Wait ARQ, Sliding window protocols, Go back N, Selective repeat. **Activity:** • Comparative analysis of TCP/IP and OSI model.	15	CO4

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	1	2	1	1	1	2	3	2	3	2	1	2
CO2	1	1	2			1	2	2	1	2	1	1	1	1
CO3	2	1	1		1	2	1	1	1	1	2	2	2	2
CO4	2	2	2	1	1	1	2	1	2	2	2	2	3	2

Strong contribution-3, Average contribution-2 , Low contribution-1,

Suggested Readings:

Text- Books	1. Data Communication and Networking, Forouzan, B.A, McGraw Hill, 4th Edition, 2006. 2. Computer Networks, Tanenbaum, A.S., Prentice Hall, 4th Edition, 2003.
Reference Books	1. Internetworking with TCP/IP Vol. 1 Principles, Comer, D.E., Prentice Hall of India,5th Edition, 2005 2. Computer Networking with Internet Protocols and Tech, Stallings, W. Prentice Hall of India, 2007. 3. Lin and Chlatmac, "Wireless and Mobile Network Architecture", John Wiley and Sons.

Para Text	**Unit 1:** • https://onlinecourses.nptel.ac.in/noc23_cs118/preview **Unit 2:** • https://archive.nptel.ac.in/noc/courses/noc21/SEM1/noc21-cs18/ **Unit 3:** • https://onlinecourses.swayam2.ac.in/aic22_ts42/preview **Unit 4:** • https://www.tutorialspoint.com/the_ultimate_canva_graphic_design_course/index.asp

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	**Marks**	**Pattern**
Mid Semester	20	**Section A:** Contains **10** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **0.5 Marks.** **Section B:** Contains **07** descriptive questions out of which **05** questions are to be attempted. Each question carries **03 Marks**.
Activity/ Practical	10	Will be decieded by subject teacher
Class Test	05	Contains **05 descriptive questions.** Each question carries **01** Mark.
Online Test/ Objective Test	05	Contains **10 multiple choice questions.** Each question carries **0.5** Marks.
Assignment/ Presentation	05	Assignment to be made on topics and instruction given by subject teacher
Attendance	05	As per policy
Total Marks	**50**	

Course created by: Dr. Mohd Haleem

Signature:

Approved by: Prof. Mansaf Alam

Signature: