Lok Jagruti Kendra University
University with a Difference

Diploma in Computer Engineering

LJ Polytechnic

Course Code: 025020304

Data Communication & Networking

Programme/ Branch Name			Diploma in Computer Engineering			
Course Name	Data Communication & Networking				**Course Code**	025020304
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				**Evaluation Scheme**			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
3	0	2	4	50	50	50	150

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Basic knowledge of Computer System.
- ✓ Basic knowledge about the Windows Operating System.

3. Rationale

This course aims to understand the basics of Data Communication, its significance, and its usage. The students will understand the fundamental concepts of networking. The course focuses on understanding the services being offered at each layer of the network protocol suite. To have an understanding of different network protocols, network metrics, and different applications of the Internet and build network using network simulation tool.

4. Objectives

- ✓ Build an understanding of modern network architectures from design and performance perspective.
- ✓ To be able to understand fundamental concepts of communication networks like network devices, topologies, types of network, addressing mechanism and routing.
- ✓ To make students familiar with services and functionalities offered at each layer.
- ✓ Learn various protocols at data link layer, network layer, transport layer & application layer.
- ✓ To familiarize with the basic taxonomy & terminology of data communication and networking using the concept of layered approach.

5. Contents

Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1	**Data Communication Introduction**	1.1 Data Communication 1.2 Computer Network 1.3 Standards Organizations for Data Communication 1.4 Types of Area Networks 1.5 Line Configuration and Its classification 1.6 Types of Network Topologies 1.7 Data Flow modes: Simplex, Half-Duplex, Full-Duplex	• Understand the significance of data communication and the significance of computer networking. • Categorize network based on physical scope. • Study various circuit arrangements for data communication. • Study of various computer network topologies. • Data communication flow during communication of two devices	15	8
2	**Transmission Media**	2.1 Transmission Media 2.2 Guided Media 2.3 Unguided Media	• Study guided and unguided transmission media. • Select appropriate transmission media for a given network.	15	7
3	**Network Devices**	3.1 Network Devices 3.2 Repeater 3.3 Hub 3.4 Bridge 3.5 Switch 3.6 Router 3.7 Gateways	• Understand the terminologies related to networking devices. • Working on various network devices. • Comparison of various network devices.	25	10
4	**Layered Models**	4.1. Network Model Based on Layered Architecture. 4.2. OSI Model 4.3. TCP/IP Model 4.4. Connection-oriented and Connectionless Approach 4.5. Comparison of OSI Model and TCP/IP Model	• Study all layers of OSI and TCP/IP Model. • Understand the functions of each layer. • Connection-oriented connectionless approach. • Compare major features of OSI and TCP/IP Model.	25	10

5	**IP Protocol and Network Applications**	5.1. IP Protocol 5.2. Addressing Schemes 5.3. Subnet and Masking 5.4. DNS 5.5. Email Protocols 5.6. FTP 5.7. HTTP	• Learn IP addressing schemes. • Learn IPv4 and IPv6 protocol. • Study subnet and usage of subnet masking. • Study various network applications.	20	7
				Total Hours	**42**

6. List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/program outcomes. Following is the list of practical exercises for guidance.

Sr. No	Practical / Exercises	Key Competency	Hours
1	Implementation and comparison of topologies using Cisco packet tracer.	Compare various network topologies.	4
2	Create a simple network using Cisco packet tracer where hub is used to connect a star network and replace it with a switch. Also observe the PDU transmission and note the changes in simulation mode.	Study of Star network using Visual simulation tool.	2
3	Study of preparing network cables for connection of networks using guided media.	Knowledge about skills like cable crimping and testing EIA/TIA standards.	2
4	Demonstrate the use of different cables in Cisco packet tracer.	Knowledge about different transmission cables.	2
5	Study of various network devices for connecting a network.	Knowledge about the working principle of the connecting devices.	4
6	Demonstrate working of a router in packet tracer.	Working of Router and its role in networking.	2
7	Demonstrate working of a hub in packet tracer.	Working of Hub and its role in networking.	2
8	Demonstrate working of a switch in packet tracer.	Working of Hub and its role in networking.	2
9	Study the different networking model and prepare a report on OSI networking model describing features and functions of all the layers included in OSI model.	Study of Different Networking Model.	2
10	Configure a unique IP address and appropriate subnet mask.	Use CLI and Cisco Packet Tracer both to learn the use of various Network Commands.	2

11	Demonstrate use of FTP protocol to transfer file from one system to another system.	Study of File Transfer Protocol to send files from one device to other.	2
12	Demonstrate use of EMAIL protocols to transfer file from one system to another system.	Study of SMTP and POP3 Protocol.	2
		Total Hours	**28**

7. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1	Data Communication Introduction	35	40	25	-	-	-
2	Transmission Media	30	35	35	-	-	-
3	Network Devices	25	35	35	-	-	5
4	Layered Models	35	40	20	-	5	-
5	IP Protocol and Network Applications	25	30	40	-	5	-

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

8. Textbooks

1) Data Communications & Networking by Behrouz A.Forouzan, Latest Edition,Tata McGraw Hill publication.

9. Reference Books

1) Computer Networks by Andrew S. Tanenbaum, Latest Edition, PrenticeHall India.
2) Data & Computer Communications by William Stallings, Latest Edition, Pearson.
3) Computer Networks: A Top Down Approach by Behrouz A. Forouzan., Latest Edition, Tata McGraw Hill publication.

10. Open Sources (Website, Video, Movie)

1) https://nptel.ac.in/courses/106/105/106105183/
2) https://www.netacad.com/courses/packet-tracer
3) https://nptel.ac.in/courses/106/106/106106091/