Lok Jagruti Kendra University
University with a Difference

Diploma in Electronics & Communication Engineering

LJ Polytechnic

Subject Code: 025030502
Computer Network & Security

Programme / Branch Name	Diploma in Electronics and Communication					
Course Name	Computer Network & Security				**Course Code**	025030502
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**
4	0	2	5	50	50	50	1

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

2. Prerequisite

- ✓ Basic Knowledge of Computers and Communication
- ✓ Basic idea of computers and operating comfort with modern computers is good.

3. Rationale

Computers and computer networks are the sole of the present telecommunication system. Advanced digital communication system is based on the computer networks. Now a days every organization, industry or the service sector own their private computer networks. Therefore, in every organization, the maintenance of the computer networks becomes one of the essential jobs of a diploma electronics engineer too. This course is therefore designed to help the Electronics and Communication diploma holders to develop this competency.

4. Objectives

- ✓ Discuss basic concepts, the need, and the various components in Networking.
- ✓ Learn the types of network topologies used in a network.
- ✓ Discuss the importance of LAN components, protocols and addressing schemes.
- ✓ Learn the basic concepts of WAN connectivity and its devices.

5. Contents

Unit No.	Topics	Sub-Topics	Learning Outcome	% Weigh tage	Hours
1	**Introduction to Computer Network**	1.1. Basics of Computer Network 1.2. Applications of computer networks 1.3. Components of Computer Networks: hardware and software 1.4. Network topologies 1.5. Network Classification 1.6. Different types of servers	• Need and Advantages of Computer Networks • Applications of computer networks: Business, Industrial and home applications • functions of various components of Computer Networks • Network topologies: Star, Ring, Bus, Mesh, Tree, Hybrid • Network Classification • Based on Transmission Technologies: Point-to-point, broadcast • Based on scale: PAN, LAN, WAN, MAN, VPN, Internet • Based on Architecture: Peer to Peer, Client Server, • advantages of Client Sever over Peer-to-Peer Model	20	14
2	**The Reference Model**	2.1 Terms: Protocol, Interface, Services, Primitives, semantics, syntax 2.2 The OSI-ISO Reference Model 2.3 The TCP/IP Reference Model 2.4 Comparison of OSI and TCP/IP model	• Define the terms: Protocol, Interface, Services, Primitives, semantics, syntax • The OSI-ISO Reference Model: Brief functional description of each layer with list of protocols • The TCP/IP Reference Model: Brief functional description of each of the Layer with list of protocols • Compare the major features of OSI and TCP/IP model	25	12

3	**Network Media and Hardware**	3.1 Transmission Media: Unguided and Guided media, Wired and Wireless, UTP, Coaxial and Fiber optical cable 3.2 Physical Layer Interfaces: Types of Connectors and Signals 3.3 Line coding and Line coded signal 3.4 Sub layers of Data Link Layers: MAC, LLC 3.5 Network devices: Repeater, Hub, Bridge, Switch, Router, B-router, Gateway, Network Adapter, Access point, Wireless Access points, 3.6 Fast and Gigabit Ethernet 3.7 FDDI and CDDI 3.8 Servers: File, Print, Mail, Proxy, Web	• Characteristics of guided and unguided transmission media • Specifications of UTP and coaxial cable • Constructional details of UTP and coaxial cable with labels • Various line signals • Characteristics of physical layer connectors • Need of line coding. • Structure of MAC and LLC sublayers • Functions of following network devices: Repeater, Hub, Bridge, Switch, Router, B-router, Gateway, Network Adapter, Access point, Wireless Access points • Differentiate between FDDI and CDDI • Compare the functions of various types of Servers	25	10
4	**Internet architecture**	4.1 Internet addresses: gateway addressing, network and broadcast addressing, dotted decimal notation, loopback addressing 4.2 IP layer Protocols: IPv4 and IPv6 frame Format 4.3 Connection oriented and Connectionless services 4.4 TCP and UDP frame format	• IP addressing scheme with examples. • Various components of IP v4 and IPv6 protocol. • Compare functions and services TCP and UDP. • Differentiate between DNS, Email and FTP • Working of a Firewall used for network security. Role of Cyber security Laws	25	10

		4.5 Domain Name System: Introduction, mapping to IP addresses 4.6 Security – Social issues, Hacking, precautions and Firewall, Cyber security Laws			
5	**Internet Services and its applications**	5.1 Cable modem system 5.2 ADSL and broad band modem 5.3 Internet Services World Wide Web: Web browser, HTML, web servers 5.4 Electronic Mail: Functions of E-mail system, User agent, Message format, Mail Protocols (SMTP, POP3), FTP, Remote Login 5.5 Voice and Video over IP 5.6 Social services: Forum, Newsgroup, blog	• Compare ADSL and broad band modem • Classify different Internet Services • Differentiate FTP and Remote login Voice and Video is transferred over IP. Diagram	20	10
				Total Hours	**56**

6. List of Practicals / Exercises

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

Sr. No	Practical / Exercises	Key Competency	Hours
1	Connect computer terminal in various physical topologies and test the data transfer	Simulation	2
2	Compare performance of various types physical layer Connectors	Simulation	2
3	Prepare and Test Straight UTP Cable.	Simulation	2
4	Prepare and Test Cross UTP Cable	Simulation	2
5	Install/configure/Test Network Interface Card/port	Simulation	2
6	Install/configure/Test Networking devices	Simulation	2
7	Install/configure/Test small LAN using Hub/switch	Simulation	2
8	Install/configure/Test File Server	Simulation	2
9	Install/configure/Test Print Server	Simulation	2
10	Install/configure/Test Web Server	Simulation	2
11	Configure/Test Internet connectivity	Simulation	2
12	Install and configure a Firewall for the network security	Simulation	2
13	Install/configure/Test Network operating System	Simulation	2
14	Prepare report on e-mail service: contact list, group list, sorting, searching, spam, inbox, sent mail, draft	Simulation	2
		Total Hours	24

7. Suggested Specification Table with Hours

Unit No.	Chapter Name	Teaching Hours	Distribution of Topics According to Bloom's Taxonomy					
			R %	U %	App %	C %	E %	An %
1	Introduction to Computer Network	14	40	20	20	0	10	10
2	The Reference Model	12	20	20	15	20	20	5
3	Network Media and Hardware	10	20	20	20	15	10	15
4	Internet architecture	10	20	20	15	20	10	15
5	Internet Services and its applications	10	30	20	20	10	10	10

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

8. Textbooks

1) Data Communication and Networking -Forouzen-Tata McGraw Hill, Education New Delhi (Latest edition)
2) Computer Networks-Tannenbaum AndrewS Wetherall David J.-Pearson, New Delhi, 5th Edition, 2011

9. Reference Books

1) Data Communication Networks by Sharma Sanjay S.K. Kataria and Sons, New Delhi (Latest edition)
2) Computer Networks by Trivedi Bhushan-Oxford University Press, New Delhi 2013

10. Open Sources (Website, Video, Movie)

1. http://www.tutorialspoint.com/data_communication_computer_network/index.htm
2. http://www.e-tutes.com/lesson1/networking_fundamentals_lesson1_1.htm
3. http://www.techiwarehouse.com/engine/d9e99072/Basic-Networking-Tutorial
4. http://www.nptel.com
5. http://www.w3schools.com/
6. http://nptel.iitm.ac.in/courses.php?disciplineId=106
7. http://www.edrawsoft.com
8. Network Simulator Tool: GNS3 v0.8.5, NetSimK
9. www.learnerstv.com