Devi Ahilya University, Indore, India **Institute of Engineering & Technology**				**III Year B.E. (Information Technology (Full Time)**		
Subject Code & Name	**Instructions Hours per Semester & Credits**					
5RIPC3 **Computer Networks**	**Classroom Instruction (CI)**		**Lab Instruction (LI)**	**Term Work (TW) and Self Learning (SL)**	**Total no. of Hours Per semester**	**Total Credits (Total Hours/30)**
Duration of Theory Paper: 3 Hours	**L**	**T**	**P**	**TW+SL**	**120**	**4**
	20	**10**	**20**	**70**		

Learning Objective

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer Networking area.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Objective:

The course is designed

1. To understand of the fundamental concepts of computer networking.
2. Familiarize the the basic taxonomy and terminology of the Computer Networking area.
3. Expertise in specific areas of networking such as the design and maintenance of individual networks.
4. Understand existing protocols and apply in new fields.
5. With the help of simulators, can minimize cost of maintenance.

Prerequisite:
Basic knowledge of programming and Data Structures.

Course Outcome:

Students earned credits will develop ability to

CO. No.	CO	PO
CO1	Definition and goals, Design issues, Network architecture, OSI reference & TCP/IP Network classification-LAN, WAN & MAN, protocols & services, connection oriented and connectionless, different protocols. Transmission Media, Wireless transmission, circuit, packet & message switching, Network devices & cabling.	PO-1 , PO-2
CO2	Framing, Error control methods, Flow control algorithm, piggybacking, Aloha, CSMA, CSMA/CD, MAC addressing frame format. Ethernet.	PO-1, PO-2, PO-3
CO3	Network Layer: Introduction, issues, Routing, congestion control, Internetworking, IP Addressing and subnet masking, IP protocols, NAT, ARP.	PO-2, PO-3, PO-4
CO4	Introduction, design issues, Transport layer addressing, buffering, recovery, TCP & UDP Network applications, Connection establishment, Connection release, TCP Header.	PO-3, PO-4, PO-5
CO5	Introduction to application layer, Application layer protocols: Electronic mail, File transfer, remote login, WWW, Multimedia, Firewalls etc.	PO-3, PO-4, PO-5,

CO-PO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	2											
CO2	3	3										
CO3		2	3	2								
CO4			2									
CO5			2	3	3							

Prerequisite:
Basic knowledge of programming and Data Structures.

COURSE CONTENTS

UNIT-I

Introduction: Definition and goals, Design issues, Network architecture-broadcast & point to point, Models-OSI reference & TCP/IP and their comparative study, Network classification-LAN, WAN & MAN, protocols & services, types of service-connection oriented and connectionless, different protocols. Transmission Media: Twisted Pair, Coaxial cable, Fiber optic cable, Wireless transmission, telephone system, multiplexing, switching-circuit, packet & message switching, Virtual circuit switch.Network devices-repeater, bridge, router, gateways, network interface cards, cabling system.

UNIT-II

Data Link Layer: Framing, Error control-Bit Error, causes of error, control methods, Flow control: Stop & wait, sliding window concept, piggybacking.Local Area Network Technology: Protocols- Aloha, CSMA, CSMA/CD, Collision free protocols, IEEE 802 protocols, standard- topologies, cabling system, Network management, MAC addressing frame format. Ethernet.

UNIT-III

Network Layer: Introduction, features & design issues, Routing- different routing algorithms, congestion control, Internetworking- Concepts and architecture. Addressing-IP Addressing and subnet masking, IP protocols, Network Address Translation, Address resolution protocol (ARP).

UNIT-IV

Transport Layer: Introduction, design issues, Transport layer addressing, buffering, multiplexing, recovery, TCP/IP suit of protocols- TCP & UDP Network applications, Connection establishment, Connection release, TCP Header.

UNIT-IV

Application Layer: Introduction to application layer, Application layer protocols: Electronic mail, File transfer, remot login, WWW, Multimedia etc. Firewalls.

Learning Outcomes:
After completing this course the student must demonstrate the knowledge and ability to:

1. Understand and explain Data Communications System and its components.
2. Identify the different types of network topologies and protocols.
3. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
4. Identify the different types of network devices and their functions within a network.
5. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

6. Understand and building the skills of subnetting and routing mechanisms.

Books Recommended :

[1]. Comuter Networks, Andrew. S. Tanenbaum, 4/e, Prentice Hall of India Private Ltd, 2003.
[2]. Data Communications and Networking, Behrouz A Forouzan, 4/e, Tata McGraw Hill Education Private Limited.
[3]. Data Communications & Networks, Achyut S. Godbole, Tata McGraw Hill Education Private Limited, 2002.

List of Practical Assignments:

1) Study of various network devices in detail.
2) Study of basic network commands and network configuration commands.
3) Installation of LAN card.
4) Implementation of Bit Stuffing.
5) Implementation of Byte stuffing.
6) Implementation of error correcting codes.
7) Implementation of error detection codes.
8) Study of network IP.
9) Implementation of various routing protocols.
10) Programming with Sockets.