

Devi Ahilya University, Indore, India Institute of Engineering & Technology				III Year B.E. (Information Technology) (Full Time)			
Subject Code & Name	Instructions Hours per Week			Credits			
	L	T	P	L	T	P	Total
<b>ITR5C3 COMPUTER NETWORK</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>5</b>
<b>Duration of Theory Paper: 3 Hours</b>							

### Learning Objectives:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

### Pre requisites :

Basic knowledge of programming, Data Structures and Object Orient Programming

## COURSE CONTENTS

### Unit 1 - 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 2 – 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 3 – 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 4 – 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 5 – Application Layer:**

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

#### **Recommended Books :**

- Computer Networks, Andrew. S. Tanenbaum, 4/e, Prentice Hall of India Private Ltd, 2003.
- Data Communications and Networking, Behrouz A Forouzan, 4/e, Tata McGraw Hill Education Private Limited.
- Data Communications & Networks, Achyut S. Godbole, Tata McGraw Hill Education Private Limited, 2002.
- Data and Computer Communication, William Stalling, 7/e, Prentice Hall of India Private Ltd, 2007.

#### **Learning Outcomes:**

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

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

#### **List of Assignments:**

During learning of course, students need to do 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.