# **COMPUTER NETWORKS**

VIII Semester: ECE								
<b>Course Code</b>	Category	Hours / Week			Credits	Maximum Marks		
AIT003	Core	L	Т	Р	С	CIA	SEE	Total
		3	1	-	4	30	70	100
Contact Classes: 45	<b>Tutorial Classes: 15</b>	Practical Classes: Nil				Total Classes: 60		

### I. COURSE OVERVIEW:

The main emphasis of this course is on the organization and management of local area networks (LANs)wide area networks (WANs). The course includes learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks. Topics include layered network architectures, addressing, naming, forwarding, routing, communication reliability, the client-server model, and web and email protocols. The applications of this course are to design, implement and maintain a basic computer networks.

### **II. OBJECTIVES:**

#### The course should enable the students to:

- I. How computer network hardware and software operate
- II. Investigate the fundamental issues driving network design
- III. The data transmission through protocols across the network in wired and wirelessusing routing algorithms.

### **III. COURSE OUTCOMES:**

#### After successful completion of the course, students should be able to:

- CO 1 **Describe** the functions of each layer in OSI and TCP/IP model use to Understand communicate over a network.
- CO 2 Make use of all various Techniques of Data-link layer for implementation of point-to- Understand point flow and error control mechanism.
- CO 3 **Identify** the various network layer techniques for designing subnets and supersets Understand and analyze packet flow on basis of routing algorithms.
- CO 4 **Discuss** Internetworking principles and Internet protocols (IP, IPv6and OSPF) for Analyze connecting computers to form a computer network
- CO 5 Make use of common transport layer metrics used to measure network performance Analyze include latency, bandwidth, and throughput
- CO 6 Select client-server programming model and various application layer protocols Evaluate (HTTP, SMTP, FTP and DNS) (OSI, TCP/IP) in terms of design parameters and communication modes. For communicate with servers and other applications.

## **IV. SYLLABUS:**

## UNIT-I INTRODUCTION TO PHYSICAL LAYER

Classes: 10

Introduction: Networks, network types, internet history, standards and administration; Network models: Protocol layering, TCP/IP protocol suite, the OSI model; Introduction to physical layer: Data and signals, transmission impairment, data rate limits, performance; Transmission media: Introduction, guided media, unguided media; Switching: Introduction, circuit switched networks, packet switching.

# UNIT-II INTRODUCTION TO DATA LINK LAYER

Classes: 09

Introduction: Link layer addressing; Error detection and correction: Cyclic codes, checksum, forward error correction; Data link control: DLC services, data link layer protocols, HDLC, point to point protocol, media access control: Random access, controlled access, channelization, connecting devices and virtual LAN: Connecting devices, virtual LAN.

UNIT-III THE NETWORK LAYER

Classes: 08

Network layer design issues, routing algorithms, congestion control algorithms, quality of service, and internetworking.

The network layer in the internet: IPv4 addresses, IPv6, internet control protocols, OSPF (Open Shortest Path First), BGP (Border Gateway Protocol), IP, (Internet Protocol), ICMP (internet control message protocol.

## UNIT-IV THE TRANSPORT LAYER

Classes: 09

The transport service, elements of transport protocols, congestion control; The internet transport protocols: UDP (User Datagram Protocol), TCP (Transport Control Protocol), performance problems in computer networks, network performance measurement.

UNIT-V INTRODUCTION TO APPLICATION LAYER

Classes: 07

Introduction, client server programming, WWW (World Wide Web) and HTTP (Hyper Text Transfer Protocol), FTP (File Transfer Protocol), E-mail, telnet, secure shell, DNS(Domain Naming System), SNMP (Simple Network Management Protocol).

**Text Books:** 

- 1. Andrew S. Tanenbaum, David.J.Wetherall, "Computer Networks", Prentice-Hall, 5<sup>th</sup> Edition, 2010.
- 2. Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, 5<sup>th</sup> Edition, 2012.

## **Reference Books:**

- 1. Douglas E. Comer, "Internetworking with TCP/IP ", Prentice-Hall, 5<sup>th</sup> Edition, 2011.
- 2. Peterson, Davie, "Computer Networks", Elsevier, 5<sup>th</sup> Edition, 2011.
- 3. Comer, "Computer Networks and Internets with Internet Applications", 4th Edition, 2004.
- 4. Chwan Hwa Wu, Irwin, "Introduction to Computer Networks and Cyber Security", CRC Publications, 2014.

## Web References:

- 1. http://computer.howstuffworks.com/computer-networking-channel.htm
- 2. http://www.ietf.org
- 3. http://www.rfc-editor.org/
- 4. https://technet.microsoft.com/en-us/network/default.aspx

## **E-Text Books:**

- 1. http://www.freebookcentre.net/networking-books-download/Lecture-Notes-on-Computer-Networks.html
- 2. http://www.freebookcentre.net/networking-books-download/Introduction-to-Computer-Networks.html

## **MOOC Course**

1. https://www.mooc-list.com/course/networking-introduction-computer-networking-stanforduniversity

2. https://lagunita.stanford.edu/courses/Engineering/Networking/Winter2014/about.

## **Course Home Page:**