COMPUTER NETWORKS

V Semester: CSE / IT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AITB10	Core	3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

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 wireless using routing algorithms.

COURSE OUTCOMES:

Upon the successful completion of this course, students will be able to:

CO 1 **Demonstrate** the ability to unambiguously explain networking as it relates to the connection of computers, media, and devices.
CO 2 **Understanding** of the basic concepts of data communications including the key aspects of networking and their interrelationship, packet switching, circuit switching and cell switching as internal and external operations, physical structures, types, models, and internetworking.
CO 3 **Illustratively** explain the concept of Hamming distance, and the significance of the minimum Hamming distance and its relationship to errors as well as detection and correction of errors in block codes.
CO 4 **Evaluate** the performance of a single link, logical process-to-process (end-to-end) channel, and a network as a whole (latency, bandwidth, and throughput).
CO 5 **Distinguish** between the different types of bit errors and can explain the concept of bit redundancy and how it is generally achieved in the facilitation of error detection and the main methods of error correction.
CO 6 **Explain** and demonstrate the mechanics associated with IP addressing, device interface, association between physical and logical addressing, subnetting and supernetting.
CO 7 **Discuss** internetworking principles and how the Internet protocols IP, IPv6 and ICMP operate.
CO 8 **Understand** routing principles and algorithms, such as distance vector and link state.
CO 9 **Explain** the concept of reliable and unreliable transfer protocol of data and how TCP and UDP implement these concepts.
CO 10 **Distinguish** four levels of addresses (physical, logical, port, and specific used by the Internet TCP/IP protocols.
CO 11 **Understand** the significance, purpose of protocols (FTP, SMTP), standards and use in data communications and networking.
CO 12 **Describe** the most common DNS resource records that occur in a zone file.

MODULE-I	INTRODUCTION	Classes: 10

Introduction: Networks, network types, internet history, standards and administration; Network models: Protocol layering, TCP/IP protocol suite, the OSI model Transmission media: Introduction, guided media, unguided media; Switching: Introduction, circuit switched networks, packet switching.

MODULE-II	DATA LINK LAYER	Classes: 10
Introduction: Link layer addressing; Error detection and correction: Cyclic codes, checksum, forward error correction; Data link control: DLC services, data link layer protocols, media access control: Random access, virtual LAN.		
MODULE-III	**NETWORK LAYER**	**Classes: 09**
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), IP (Internet Protocol)		
MODULE-IV	**TRANSPORT LAYER**	**Classes: 08**
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.		
MODULE-V	**APPLICATION LAYER**	**Classes: 08**
Introduction, client server programming, WWW (World Wide Web) and HTTP (Hyper Text Transfer Protocol), FTP (File Transfer Protocol), E-mail, telnet, DNS (Domain Naming System), SNMP (Simple Network Management Protocol).		

Text Books:

1. Behrouz A. Forouzan,–Data Communications and Networking‖, TataMcGraw-Hill,5th Edition, 2012.
2. Andrew S. Tanenbaum, David.j.Wetherall, ―Computer Networks‖, Prentice-Hall, 5th Edition, 2010.

Reference Books:

1. Douglas E. Comer, –InternetworkingwithTCP/IP –,Prentice-Hall, 5thEdition,2011.
2. Peterson, Davie, Elsevier,–ComputerNetworks‖,5thEdition,2011
3. Comer,―ComputerNetworksandInternetswithInternetApplications‖,4thEdition,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. https://www.geeksforgeeks.org/layers-osi-model/
3. https://www.wikilectures.eu/w/Computer_Network
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-stanford-university
2. https://lagunita.stanford.edu/courses/Engineering/Networking/Winter2014/about.