COURSE CONTENT

ADVANCED COMPUTER NETWORKS								
I Semester: CSE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
BCSE05	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	0	0	3	40	60	100
Contact Classes: 45	**Total Tutorials: Nil**	**Total Practical Classes: Nil**				**Total Classes: 45**		

I. COURSE OVERVIEW:

This is an advanced level undergraduate course in computer networking. The course is designed to include materials relevant to the industry, for example IP routing and traffic engineering. The course deals with the principles, architectures, algorithms, and protocols related to the Internet, with emphasis on routing, transport protocol design, flow control and congestion control, quality of service, traffic engineering and MPLS.

II. COURSE OBJECTIVES:

The students will try to learn:

I. The advanced networking concepts for next generation network architecture and design.
II. Transport-layer services and principles of congestion control.
III. The basic taxonomy and terminology of the computer networking area.

III. COURSE OUTCOMES:

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

CO1 Understand advanced concepts and next generation networks.

CO2 Analyze TCP/IP variants, network Algorithm's, Protocols and their functionalities

CO 3 Analyze the performance of various server implementations

CO 4 Choose different routing protocols in the given network situation

CO 5 Configure various application layer protocols

IV. COURSE CONTENT:

MODULE-I: INTRODUCTION (9)
Review of Computer Networks, Devices and the Internet: Internet, Network edge, Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, Networking and Internet - Foundation of Networking Protocols: 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing. Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure. The Link Layer and Local Area Networks-Link Layer, Introduction and Services, Error- Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet, Interconnections: Hubs and Switches, PPP: The Point-to-Point Protocol, Link Virtualization.

MODULE-II: DATA LINK PROTOCOLS (9)
Data-link protocols: Ethernet, Token Ring and Wireless (802.11). Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs), Multiple access schemes.
Routing and Internetworking: Network–Layer Routing, Least-Cost-Path algorithms, NonLeast-Cost-Path algorithms, Intra-domain Routing Protocols, Inter-domain Routing Protocols, Congestion Control at Network Layer**.**

MODULE-III: LOGICAL ADDRESSING (9)
Logical Addressing: IPv4 Addresses, IPv6 Addresses - Internet Protocol: Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6.

Multicasting Techniques and Protocols: Basic Definitions and Techniques, Intra-domain Multicast Protocols, Inter-domain Multicast Protocols, Node-Level Multicast algorithms.

MODULE-IV: TRANSPORT AND APPLICATION LAYER PROTOCOLS (9)
Transport and Application Layer Protocols: Client-Server and Peer-To-Peer Application Communication, Protocols on the transport layer, reliable communication. Routing packets through a LAN and WAN.
Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control. Principles of Network Applications.

MODULE-IV: THE WEB AND HTTP, FILE TRANSFER (9)
The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing, Socket Programming with TCP and UDP, Building a Simple Web Server
Creating simulated networks and passing packets through them using different routing techniques. Installing and using network monitoring tools.

V TEXT BOOKS:

1. Computer Networking: A Top-Down Approach, James F. Kuros and Keith W. Ross, Pearson, 6th edition, 2012.
2. Computer Networks and Internets, Duglas E. Comer, 6th edition, Pearson education.

VI. REFERENCE BOOKS:

1. A Practical Guide to Advanced Networking, Jeffrey S. Beasley and Piyasat Nilkaew, Pearson, 3rd edition, 2012.
2. Computer Networks , Andrew S. Tanenbaum, David J. Wetherall, Prentice Hall.

VII. MATERIALS ONLINE

1. Course template
2. Tutorial question bank
3. Tech talk topics
4. Open,Ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper, I
8. Model question paper, II
9. Lecture notes
10. Power Point presentation
11. E-Learning Readiness Videos (ELRV)