

<b>Devi Ahilya University, Indore, India Institute of Engineering &amp; Technology</b>				<b>ME I Year Information Technology (Sp. Information Security) Semester- A</b>			
<b>Subject Code &amp; Name</b>	<b>Instructions Hours per Week</b>			<b>Credits</b>			
<b>ISR1C3: Advanced Computer Networks</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Total</b>
<b>Duration of Theory Paper: 3 Hours</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>5</b>

**Course Objective:**

Provide students with enhance base of knowledge of Computer Networks, Develop a comprehensive knowledge of Tools and Techniques used in Management of Computer Networks, Develop skills in independent managing Network Performance related issues Develop ability to carry out research in area of Computer Networks

**COURSE CONTENT**

**Unit I : Foundation**

Computer Networks and Internet, Structure of network software in an operating system, Packet Switching and Circuit Switching, Protocols Layers and Network Service Models, Implementing Network Software (Sockets), Network Performance - Delay, Loss , Throughput, and Bandwidth, Best-effort services and QoS guarantees for multimedia data.

**Unit II : Link Layer, Access Networks and LANs**

Services Provided by Link Layer, Link Layer Implementation, Multiple Access Protocols and Ethernet, Switched Local Area Networks, Link Layer Addressing (ARP), RARP, VLANs, Link Virtualization and MPLS, Data Center Networking

**Unit III : Network Layer and Internetworking**

Virtual Circuit and Datagram Networks, Internet Protocol, IPV4 -Class full and Classless Addressing, Subnetting, IPV6 Addressing, IP Datagram delivery and forwarding, Routing Algorithms- Distance Vector and RIP, Link State Routing and OSPF, Inter domain Routing - BGP, DHCP, ICMP, Router-switching, input/output processing, Routing Control Plane, Network Virtualization- VPN and NAT.

**Unit IV : Transport Layer and End-to-End Protocols**

Transport layer services in Internet, Multiplexing and De-multiplexing, Connectionless Transport: UDP segment format and checksum, Connection Oriented Transport: TCP-segment format, roundtrip estimation and Timeout, Reliable data Transfer, Flow control, TCP connection Management, TCP congestion control Additive Increase/Multiplicative Decrease, Slow start, Fast Retransmit and Fast Recovery, Fairness and Queuing Disciplines.

**Unit V : Application Layer**

Network Application Architecture and Process Communication, Web and HTTP, File Transfer FTP, Electronic Mail- SMTP, POP, IMAP, MIME, Internet Discovery Service-DNS, Network Management – SNMP, Advance topics - Software Defined Networking, Internet of Things

**Text and Reference books:**

- [1] Computer Networking, A Top-Down Approach, 6th Ed., J. Kurose and K. Ross, Pearson, 2013.
- [2] Computer Networks, A Systems Approach, 5th Edition, L. Peterson and B. Davie, Morgan Kaufman, 2012.
- [3] Internetworking with TCP/IP Volume I, 6th Ed., D. E. Comer, Pearson Education, 2013.
- [4] Internetworking with TCP/IP Volume II, 3rd, Ed., D. E. Comer and David L. Stevens, Pearson Education, 2003.
- [5] Data Communications and Networking, 4th Ed., Beharouz A. Forouzan, McGraw-Hill Education Private Ltd., 2006.