

UNIVERSITY OF MADRAS  
 MASTER OF COMPUTER APPLICATIONS (MCA) DEGREE PROGRAMME  
 SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Paper	<b>Computer Networks</b>		
Core - VII Theory	I Year & II Semester	Credit:4	435C2C

**Course Objectives**

To understand the basic concepts of Transmission Control Protocol/Internet Protocol and associated functions

Explore to describe the internet architecture and its processes associated with the data transfer and to provide the quality of service

To understand technologies and services associated with network protocols along with the challenges of data transfer.

Learners will understand the importance and functioning of Routing Protocols over communication service.

Empower the learners to comprehend and manage the issues associated with IP protocols like data traffic problems, security and mobility.

**Unit I:** Transmission Control Protocol/Internet Protocol : Fundamental Architecture - Internet Protocol Basics - Routing - Transport-Layer Protocols : Transmission Control Protocol - User Datagram Protocol - Stream Control Transmission Protocol - Real-Time Transport Protocol.

**Unit II:** Internet Architecture: Internet Exchange Point - History of Internet Exchange Points - Internet Service Provider Interconnection Relationships - Peering and Transit - IP Routing Protocols: Overview of Routing Protocols - Routing Information Protocol - Open Shortest Path First - Border Gateway Protocol - Multiprotocol Label Switching.

**Unit III:** IP Quality Of Service : Introduction - Quality of Service in IP Version 4 - Integrated Services - Differentiated Services - Quality of Service with Nested Differentiated Services Levels - IP Multicast and Anycast: Addressing - Multicast Routing - Routing Protocols – Anycasting- IPv6 Anycast Routing Protocol: Protocol Independent Anycast—Sparse Mode - Transport over Packet: Draft-Martini Signaling and Encapsulation - Layer-2 Tunneling Protocol.

**Unit IV:** Virtual Private Wired Service - Types of Private Wire Services - Generic Routing Encapsulation - Layer-2 Tunneling Protocol - Layer-3 Virtual Private Network 2547bis, Virtual Router - IP and Optical Networking: IP/Optical Network Evolution - Challenges in Legacy Traditional IP/Optical Networks - Automated Provisioning in IP/Optical Networks - Control Plane Models for IP/Optical Networking - Next-Generation MultiLayer Network Design Requirements - Benefits and Challenges in IP/Optical Networking - IP Version 6: Addresses in IP Version 6 - IP Packet Headers - IP Address Resolution - IP Version 6 Deployment: Drivers and Impediments.

**Unit V:** IP Traffic Engineering: Models of Traffic Demands - Optimal Routing with Multiprotocol Label Switching - Link-Weight Optimization with Open Shortest Path First - Extended Shortest-Path-Based Routing Schemes - IP Network Security: Introduction - Detection of Denial-of-Service Attack - IP Trace back- Edge Sampling Scheme - Advanced Marking Scheme - Mobility Support for IP: Mobility Management Approaches - Security Threats Related to IP Mobility - Mobility Support in IPv6 - Reactive Versus Proactive Mobility Support -

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Relation to Multihoming - Protocols Supplementing.

### Text Book :

1. “Advanced Internet Protocols, Services and Applications”, Eiji Oki, Roberto Rojas-Cessa, Mallikarjun Tatipamula, Christian Vogt, Copyright © 2012 by John Wiley & Sons, Inc.

### Reference Books :

1. “TCP/IP Protocol Suite”, Behrouz A. Forouzan, Fourth Edition, Tata McGraw-Hill Edition 2010.
2. “Computer Communications and Networking Technologies” - Michael A. Gallo & William M. Hancock- BROOKS&COLE
3. “Computer Networks and Internets” -Douglas E. Comer- PEARSON.
4. Data and Computer Communications- Eighth Edition- William Stallings- Pearson Education.
5. Network Security Bible, 2nd edition, Eric Cole, Wiley Publishers.
6. Data communication and networks –James Irvine and David Harley- Publishers: Wiley India

### Course Outcomes:

On the successful completion of the course, students will be able to

CO1	Understand, analyse and examine the concepts of Communication Protocols with its architecture and functions.	K1-K6
CO2	Illustrate and apply the appropriate internet architecture along with efficient protocol models for the user defined communication environment.	K1-K6
CO3	Comprehend, categorize and formulate the appropriate IP routing protocol to establish a efficient data transfer.	K1-K6
CO4	Comprehend, analyse and evaluate the concepts of Virtual wired service and IP/optical networking with its functions and deployment.	K1-K6
CO5	Elucidate, analyse and inspect the IP traffic engineering and its models along with the security mechanisms.	K1-K6

K1- Remember, K2- Understand, K3- Apply , K4- Analyze, K5- evaluate and K6- Create

### Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	-	L	M	S	M	M	-	S
CO2	S	M	-	S	M	L	M	S	-	M
CO3	S	S	-	M	S	S	S	M	-	S
CO4	S	M	L	S	M	L	S	L	-	M
CO5	M	S	M	L	S	L	M	S	-	S

S- Strong; M-Medium; L-Low