MCA I Semester 2

Subject Name: Fundamentals of Networking **Subject Code:**MTCA23209

Type of course: Professional Core Course

Prerequisite: None

Rationale: With the approach of the World Wide Web expanding, students should have an understanding of the protocols, network metrics and applications of the Internet and various internetworking devices.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks		Practical Marks		Total
L	T	P	C	TEE	CAT	TEP	CAP	
3	0	0	3	60	40	-	-	100

CAT: Continuous Assessment Theory comprised of CA1 and CA2 **CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CAP:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in courses.

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	**Introduction:** What is Internet, A Services Description, What Is a Protocol?, Access Networks, Physical Media, Switching Techniques - Packet Switching, Circuit Switching, Delay, Loss, throughput, Layered Architecture OSI Model, TCP/IP Model	6	13%
2.	**Application Layer:** Principles of Network Applications, Network Application Architectures, Processes Communicating, Transport Services Available to Applications, Transport Services Provided by the Internet, Application-Layer Protocols, Web & HTTP, DNS, Electronic Mail SMTP, Mail Message Format, Mail Access Protocols, Socket Programming with UDP and TCP. Protocol Analysis using Wireshark	7	15%
3.	**Transport Layer:** Transport layer Protocols and its services, Multiplexing and Demultiplexing, Connectionless service – UDP, UDP Segment Structure, UDP Checksum, Connection-Oriented Transport: TCP, The TCP Connection, TCP Segment Structure, Round-Trip Time Estimation and Timeout, Reliable Data Transfer, Flow Control, TCP Connection Management, Causes and Cost of Congestion control and approaches, TCP congestion control, Protocol Analysis using Wireshark	11	25%
4.	**Network Layer:** Forwarding and Routing, Network Service Models, Virtual and datagram networks, IP Datagram Format, IPv4Addressing, Internet Control Message Protocol (ICMP), Distance Vector Routing, Link State Routing, Hierarchical Routing. Protocol Analysis using Wireshark	11	25%
5.	**Data link Layer:** Data Link layer Design Issues, Link layer services, Parity Checks, Checksumming Methods, Cyclic Redundancy Check (CRC), Multiple Access Protocols, Channel Partitioning Protocols, Random Access Protocols (MAP), Link-Layer Addressing and ARP, Ethernet, Link-Layer Switches, Virtual Local Area Networks (VLANs)	10	22%

Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
25	25	20	20	05	05

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels **(Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Computer Networking- A Top-Down approach	Kurose and Ross	Pearson ISBN-13: 978-0-13-285620-1	2013	6th Edition
2	Computer Networks	Andrew S Tanenbaum, David. J. Wetherall	Pearson Education ISBN 13 - 978-8131770221	2013	5th Edition
3	TCP/IP Protocol Suite	Behrouz A. Forouzan	McGraw Hill Education, ISBN 9780070706521 0070706522	2017	4th Edition
4	Internetworking with TCP/IP	Douglas Comer	Pearson/PHI, ISBN 13 : 978-9332550100	2015	6th Edition

Course Outcomes:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % Weightage
CO-1	Describe the Importance of computer networks, layered architecture of networks and analyze various performance metrics.	13
CO-2	Distinguish and relate various Application-Layer Protocols of computer networks and Design & implement client server application using socket programming.	15
CO-3	Distinguish between connectionless and connection oriented services.	25
CO-4	Implement various topological and routing strategies for IP based networks.	25
CO-5	Describe various Multiple Access Protocols and Ethernet variants.	22

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PO 12	PO 13
CO-1	3	0	0	0	0	0	0	0	0	0	0	0	0
CO-2	0	0	0	0	2	0	0	0	0	0	0	0	0
CO-3	0	0	0	0	2	0	0	0	0	0	0	0	0
CO-4	3	0	0	3	2	0	0	0	0	0	0	0	0
CO-5	3	0	0	0	0	0	0	0	0	0	0	0	0
Rationale *													

Rationale*: Explaining why it is matching this particular program outcome

List of Open Source/learning website:

- https://onlinecourses.swayam2.ac.in/ugc19_cs10/preview

List of Open Source Software:

- https://www.wireshark.org/

Major Equipment Needed: NA