SANKALCHAND PATEL UNIVERSITY ।। अथातो ज्ञानजिज्ञासा ।।	**FACULTY OF COMPUTER SCIENCE** **Master Of Computer Application (Sem-III)** In Effect from Academic Year 2023-24

Branch Name:	MCA
Program Code:	CS201
Course Name:	**ADVANCED NETWORKING**
Course Code:	3CS2010305T
Pre-requisite Course:	Digital Data communication concepts, Layered architecture as per OSI and TCP/IP model, Functionality of all layers in the OSI and TCP/IP model, Concepts of LAN, WAN, Internet, HTTP, Ethernet, General concepts in routing and basic routing algorithms like Djkistra's shortest path, distance vector routing, link state routing, etc., Overview of popular application layer services like HTTP, DNS, FTP etc

Course Objective:

1. Develop strong analysis, design, implementation; testing and troubleshooting skills in students regarding TCP/IP based networks and services as relevant to the computer networking needs of the IT industry.
2. Establish a strong conceptual foundation of the TCP/IP protocol stack, services and related tools/technologies so as to facilitate the development of the above-mentioned skills.
3. Design and implement customized TCP/IP based application layer services.
4. Familiarize with security and performance issues in TCP/IP networks.
5. Familiarize with Wireless Networks, WiFi and Mobile Networks, Browser Networking, XML Http Request and Server-Sent Events (SSE) and WebSocket and WebRTC
6. Create a strong conceptual foundation and offer maximum possible development of required theoretical and practical skills for students aspiring to make a career in Computer Networking Like Network Designer, Network administrator, etc.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory		Practical		
Lecture	Tutorial	Practical	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total
4	-	-	4	60	40	-	-	100

Subject Contents			
Sr. No	**Topic**	**Total Hours**	**Weightage (%)**
1	**Primer on Latency and Bandwidth, Building Blocks of TCP and UDP and Transport Layer Security (TLS).** Speed is a Feature, Components of Latency, Speed of Light and Propagation Latency, Last-Mile Latency, Bandwidth, Delivering Higher Bandwidth and Lower Latencies, TCP Three Way Handshaking, Congestion Avoidance and Control, Bandwidth Delay Product, Optimization for TCP, UDP and Network Address Translator, NAT Traversal, STUN, TURN and ICE. TLS Handshake, TLS Session Resumption, Chain of Trust and Certificate Authorities, Certificate Revocation, TLS Record Protocol and Optimizing for TLS.	10	30
2	**Wireless Networks, WiFi** Ubiquitous Connectivity, Types of Wireless Networks, Performance Fundamentals of Wireless Networks, From Ethernet to a Wireless LAN, WiFi Standards and Features, Measuring and Optimizing WiFi Performance, Optimizing for WiFi Networks.	6	10

3	**Browser Networking, XML Http Request and Server-Sent Events (SSE)** Primer on Browser Networking, XML Http Request: Brief History of XHR, Cross-Origin Resource Sharing (CORS), Downloading and uploading Data with XHR, Monitoring Download and Upload Progress, Streaming Data with XHR, Server-Sent Events (SSE): Event Source API and Event Stream Protocol.	10	30
4	**Web Socket and Web RTC** Introduction to Web Socket, Web Socket API, Web Socket Protocol, Web Socket Use Cases and Performance, Web RTC: Standards and Development of Web RTC, Audio and Video Engines, Real-Time Network Transports, Establishing a Peer-to- Peer Connection, Delivering Media and Application Data, Data Channel, Web RTC Use Cases and Performance.	10	30

Text Books:

1. Computer Network- Andrew S. Tanenbaum, Fifth edition, Pearson.

References Books:

1. Ilya Grigorik, "High-Performance Browser Networking", 2013: First Edition, O'Reilly
2. Douglas E. Comer, "Internetworking with TCP/IP - (Vol. 1) Principles, Protocols, and Architecture", 6th Edition, Prentice Hall of India (PHI) Publishers.
3. Behrouz A. Forouzan, "TCP/IP Protocol Suite", 4th Edition, McGraw-Hill
4. W. Richard Stevens, G. Gabrani, "TCP/IP- Illustrated, Vol. 1 (The Protocols)", Pearson Publishers.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To have a thorough **understanding** of TCP/IP based systems, services and related tools and technologies.	1 Remembering 2 Understanding
CLO2	To be fluent **in design and developing** Java based TCP/IP socket-based networking solutions.	3 Applying,
CLO3	To **Effectively** use available OS commands/utilities as well as popular third-party **tools** for TCP/IP networking depending upon the needs.	2 Understanding 4 Analyzing
CLO4	To geared to **adapt** to more sophisticate networking related packages in Java and hence develop relatively complex **Applications** more reliably and faster.	6 Creating
CLO5	To **Understanding** the Wireless Network, Browser Networking, Web socket and web RTC	2 Understanding
CLO6	**Learn** about varies networking technology for **solve** problem in networking	4 Analyzing

Mapping of CLOs with Pos & PSOs

Course Learning Out comes	Program Outcomes(POs)												Program Specific Out comes (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1		M			L	M	M		H	L	M		M	M
CLO2	M	M	H		M		M	L	H		M		H	M
CLO3		M		M	H		H		M	M	M	M	M	M
CLO4	L	M	M		M		H	L	H		M	H	M	H
CLO5	M		M	L		M			L	M			M	M
CLO6		M	L		L			M				M	M	M

H:High, M:Medium, L:Low