| CS208: Computer Networks | L | T | P | Fundamentals of Computer Science and Design and Analysis of Algorithms |
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**Course Objective:** The course aims to provide students with a thorough understanding of computer network principles, architectures, protocols, and technologies, enabling them to design, implement, and manage efficient, secure, and scalable computer networks.

| S. No | Course Outcomes (CO) |
|---|---|
| CO1 | Understand the foundational aspects of computer networks, including network topologies, OSI and TCP/IP models, to design and analyze network structures effectively. |
| CO2 | Master error detection and correction, data link control, and IP addressing, enabling efficient data communication across networks. |
| CO3 | Learn advanced routing protocols, Quality of Service (QoS) principles, and basic network security to manage high-performance, secure networks. |
| CO4 | Acquire a deep understanding of transport protocols like UDP and TCP, focusing on reliable data transfer and congestion control. |
| CO5 | Develop expertise in application layer protocols and network management, preparing for effective management of networked applications. |

| S. No | Contents | Contact Hours |
|---|---|---|
| UNIT 1 | Foundations of Computer Networks: Evolution of computer networks, Basic principles of network design, Network topologies: Star, Mesh, Bus, Ring, Hybrid, OSI and TCP/IP models, and Physical layer fundamentals: Data and signals, bandwidth utilization, transmission techniques and media, signal encoding, multiplexing. | 8 |
| UNIT 2 | Data Link and Network Layer Protocols: Error detection and correction mechanisms, Data link control protocols, Multiple access protocols and LAN technologies, Network layer functions and services, Routing algorithms: Link-State, Dijkstra's algorithm; IP addressing, subnetting, super netting (CIDR), IPv4, IPv6, and Address resolution protocols: ARP, RARP, BOOTP, DHCP. | 10 |
| UNIT 3 | Advanced Networking and Routing Protocols: Advanced IP addressing and routing protocols: RIP, OSPF, BGP; Multicast routing and protocols; Quality of Service (QoS) concepts and protocols; and Network security fundamentals. | 8 |
| UNIT 4 | Transport Layer and End-to-End Protocols: Transport layer services: UDP, TCP; Flow control, congestion control, TCP congestion avoidance algorithms; Session management: Establishment, and synchronization; Presentation layer roles: Data formatting, encryption, decryption | 8 |
| UNIT 5 | Application Layer Protocols and Network Management: Naming and addressing mechanisms: DNS, URIs; Communication and data transfer protocols: HTTP, SSH, Telnet, SMTP, POP3, IMAP, FTP, SFTP, FTPS; World Wide Web fundamentals; Network management with SNMP, Modern application-layer protocols: WebSockets, MQTT. | 8 |
| | **Total** | **42** |