UNIVERSITY OF MADRAS

BACHELOR OF COMPUTER APPLICATIONS (BCA)
DEGREE PROGRAMME
SYLLABUS WITH EFFECT FROM 2023-2024

Year: III **Semester: VI**

Advanced Networking	**320C6B**
Credits 3	**Lecture Hours: 6 per week**

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- To understand the concept of Data communication and Computer network
- To get a knowledge on routing algorithms.
- To impart knowledge about networking and inter networking devices
- To gain the knowledge on Security over Network communication

Course Outcomes: (for students: To know what they are going to learn)

CO1: To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models
CO2: To gain knowledge on Telephone systems and Satellite communications
CO3: To impart the concept of Elementary data link protocols
CO4: To analyze the characteristics of Routing and Congestion control algorithms
CO5: To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS

Units	**Contents**
I	Introduction to Networking Concepts and Terminology: Network Hardware and Software Overview - Reference Models: OSI and TCP/IP Models - Example Networks: Internet, ATM, Ethernet, and Wireless LANs - Physical Layer Fundamentals: Guided and Unguided Transmission Media - Network Protocols: IPv6, ARP, ICMP, DHCP, DNS - Network Virtualization
II	Wireless Transmission Technologies and Standards: Communication Satellites and Their Role in Networking - Telephone System Structure: Local Loop, Trunks, Multiplexing, and Switching - Data Link Layer: Design Issues, Error Detection, and Correction - Wireless Standards and Technologies: 5G, Wi-Fi 6/6E, Bluetooth, Zigbee Mobile Networking Protocols: LTE, VoIP
III	Advanced Data Link Protocols: HDLC, PPP - Sliding Window Protocols Data Link Layer in the Internet - Medium Access Layer: Channel Allocation Problem, MAC Protocols - Ethernet Evolution: Gigabit Ethernet, 10 Gigabit Ethernet, Ethernet Switching - Software-Defined Networking (SDN)
IV	Design Issues in the Network Layer - Routing Algorithms and Optimization Techniques - Congestion Control Algorithms and Traffic Engineering - IP Protocol: IPv4 and IPv6 - IP Addresses, Subnetting, and Address Resolution - Multiprotocol Label Switching (MPLS), IPv6 Deployment Strategies
V	Transport Layer Services and Error Recovery Mechanisms - Connection Management: TCP, UDP, SCTP - Simple Transport Protocol (STP) - Internet Transport Protocols (ITP): TCP and UDP Enhancements - Network Security Fundamentals: Cryptography, Firewalls, IDS/IPS, VPN

Learning Resources:

- **Recommended Texts**
  1. A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.
- **Reference Books**
  1. B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2015.
  2. F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008.
  3. D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.
  4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002