4MCACC1: DATA COMMUNICATION AND COMPUTER NETWORKS

Total No. of Hours: 52 **Hours/Week: 04**

Course Objective: To understand various computer networks, network technologies and application protocols

Course Outcome: Students will be able to

CO1: Understand the types of networks, network models and its related terminologies.

CO2: Describe the layer functionalities of OSI and TCP/IP model.

CO3: Comprehend the working of various layer protocols of network models.

CO4: Apply sub netting techniques to solve problems on classless and classful addressing.

CO5: Analyse and interpret concepts of network security and cryptography.

Unit I	**Introduction :** Data Communication - Networks- Network Types – Internet History – Standards and Administration. **Network Models**: Protocol Layering – TCP/IP Protocol Suite – The OSI model. **Wired LANs Ethernet**: Ethernet Protocol – Standard Ethernet – Fast Ethernet – Gigabit Ethernet – 10 Gigabit Ethernet – Connecting Devices – Hubs- Link Layer Switches – Virtual LANs. **Wireless LANs** : Introduction – IEEE802.11 Project – Bluetooth – Other Wireless Networks – WiMAX – Cellular Telephony – 1G, 2G, 3G 4G	12 hrs
Unit II	**Physical Layer :** Data and Signals – Periodic Analog Signals – Digital Signals – Transmission Impairment – Data Rate Limits – Performance – Multiplexing – FDM-WDM-TDM – Transmission Media – Guided Media – Unguided Media – Switching – Circuit Switched Networks – Packet Switching- Structure of Switch. **Data Link Layer** : Introduction – Link Layer Addressing –Error Detection and Correction – Introduction – Block Coding- Cyclic codes – Forward Error Correction – Data Link Control – DLC Services- DLL Protocols – HDLC – PPP – Media Access Control – Random Access – ALOHA-CSMA-CSMA/CD – CSMA/CA	12 hrs
Unit III	**Network Layer** :Network Layer Services – Network Layer Performance – IPv4 Addresses – Address Space – Classful – Classless Addressing Network Layer Protocols – IP –Mobile IP – Unicast Routing – Routing Algorithms – Distance Vector Routing – Link State Routing – Path Vector Routing – Unicast Routing Protocols – RIP-OSPF-BGP4- Multicast Routing Basics –IPv6 Protocol – Transition from IPv4 to IPv6. **Transport Layer** : Introduction – Transport Layer Protocols – Transmission Control Protocol – TCP Services – TCP features – Segment – A TCP connection- State Transition Diagram – Windows in TCP- Flow Control – Error Control – TCP Congestion Control – TCP timers.	12 hrs
Unit IV	**Application Layer**: WWW – HTTP-FTP-Electronic Mail – TELNET- SSH-DNS. Network Management : Introduction – SNMP- Managers and Agents – Management Components – SMI –MIB	10 hrs
Unit V	**Cryptography and Network Security :**Introduction - Security Goals - Attacks - Services and Techniques - Symmetric Key ciphers - Asymmetric - Key Ciphers - Message Integrity - Message Authentication - Digital Signature - Entity Authentication- Key management	6 hrs

REFERENCE BOOKS

[1] Behrouz A. Forouzan "*Data Communications and Networking"*, TataMcgrawHill. Fifth Edition.

[2] Andrew S. Tanenbaum, "*Computer Networks"*, Pearson, Fifth Edition

[3] AtulKahate, "*Cryptography and Network Security"*, TataMcgrawHill, Second Edition.

[4] Douglas E. Comer, "*Computer Networks and Internets with Internet Applications"*, Pearson, Third Edition.

[5] William Stalling, "*Cryptography and Network Security*", Prentice Hall, Fourth Edition.