CAC-304 Network Operations

CH. No	Topics	No.of Lect	Reference Books
1	**Introduction to Computer Networks**	10	**Forouzan & Tanenbaum**
	Data Communication · characteristics of data communication, components, data representation, data flow **Computer Networks** · goals and applications **Network Hardware** · broadcast and point-to-point **Network Topologies** · mesh, star, bus, ring, hybrid **Network Types** · LAN, MAN, WAN, Wireless Networks, Home Networks, Internet works, · Protocols and Standards – Definition of Protocol, Defacto and Dejure standard **Network Software** · Protocol Hierarchies - · layers, protocols, peers, interfaces, network architecture, protocol stack · design issues of the layers – addressing, error control, flow control, multiplexing and de-multiplexing, routing · Connection-oriented and connectionless service · Service Primitives – listen, connect, receive, send, disconnect · The relationships of services to protocol		
2	**Network Models**	6	
	OSI Reference Model • Functionality of each layer **TCP/IP Reference Model** • Introduction to IP, TCP, and UDP TCP/IP Protocol Suite • Comparison of OSI and TCP/IP model 1 FORO. Ch2 Addressing • Physical, Logical and Port addresses		**Forouzan**
3	**The Physical Layer**	8	
	Basic Concepts • Bit rate, bit length, base band transmission • Transmission Impairments – attenuation, distortion and noise • Data Rate Limits – Nyquist's bit rate formula for noiseless channel and Shannon's law • Problems on above concepts **Performance of the Network**		**Forouzan & Tanenbaum**

	• Bandwidth, Throughput, Latency(Delay), Bandwidth –Delay Product, Jitter • Problems on above concepts **Line Coding** • Characteristics, Line Coding Schemes – Unipolar, NRZ, RZ, Manchester and Differentia*l* Manchester **Transmission Modes** • Parallel Transmission • Serial Transmission – Asynchronous and Synchronous **Transmission Media** • Guided Media – Twisted Pair, Coaxial Cable, Fiber Optic Cable • Unguided Media – Radio waves, microwaves, Infrared **Switching** • Circuit Switching, Message Switching and Packet Switching		
4	**The Data Link Layer**	**7**	
	Framing • Character Count, Byte Stuffing, Bit Stuffing and Physical Layer CodingViolations **Error Control** • Hamming Code and CRC **Flow Control** • Stop and Wait ARQ for noisy channel **Sliding Window Protocols** • 1-bit sliding window protocols, Pipelining – Go-Back N and Selective Repeat		**Forouzan & Tanenbaum**
5	**The Medium Access Sub layer**	**7**	
	Random Access Protocols • ALOHA – pure and slotted • CSMA – 1-persistent, p-persistent and nonpersistent • CSMA/CD • CSMA/CA **Controlled Access** • Reservation, Polling and Token Passing **Channelization** • FDMA, TDMA and CDMA **VLANS** • Membership, Configuration and Advantages		**Forouzan & Tanenbaum**
6	**The Network Layer**	**12**	
	Design Issues • Store-and-forward packet switching, Services Provided to the Transport Layer, Implementation of Connectionless Service,		**Forouzan & Tanenbaum**

Implementation of Connection Oriented Service, Comparison of Virtual Circuit and Datagram **Logical Addressing** • IPV4 Addresses – Address Space, Notations, Classful Addressing, Classless Addressing, Network Address Translation(NAT) • IPV6 Addresses – Addressing Structure, Address Space **IPV4 Protocol** • Datagram Format, Fragmentation, Checksum, Options **IPV6 Protocol** • Advantages, Packet Format, Extension Headers **Transition From IPV4 to IPV6** • Dual Stack, Tunneling, Header Translation		

Reference Books:
Computer Networks by Andrew Tanenbaum, Pearson Education.
Data Communication and Networking by Behrouz Forouzan, TATA McGraw Hill.