

COMPUTER NETWORKS

SWE2002

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November 29, 2017

COURSE OBJECTIVE

1. To understand the fundamental of computer networks
2. To comprehend the overall architecture of a computer networks
3. To understand the different network protocols.
4. To be familiar with the components required to build different types of networks

EXPECTED OUTCOMES

On Completion of the course, the students will be able to

1. Understand and explain the fundamental principles of networking.
2. Compare and contrast various networking topologies, communications devices and services.
3. Understand about working of LAN, WAN, MAN setups.
4. Implement network protocols and analyze its performance.

UNIT - I : OVERVIEW OF COMPUTER AND COMMUNICATION NETWORKS



- Networking principles
- Network protocol-syntax, semantics and timing
- Layered protocol Stack
- Protocol Reference Models - OSI and TCP/IP
- Network Standards and standardization bodies.

- LAN topologies
- Introduction to Switching
- Circuit Switching: X.25 Network and Frame Relay
- Packet Switching: Virtual and Datagram switching
- Cell switching: ATM
- ATM architecture
- ATM layers and ATM cell format
- Multiple access

- Link layer services
- Framing
- Medium Access-CSMA and CSMA/CD
- LAN technologies: Ethernet, Gigabit Ethernet and Token Ring
- Error Detection
- Error Correction

- Introduction to Internet Protocol (IP) : IPv4, IPv6, ICMP, ARP and DHCP
- IPv4 Subnetting
- Classless addressing (CIDR)
- IPv6 addresses
- Transition from IPv4 to IPv6
- Internet header checksum
- Networking utilities commands

- Introduction to Routing algorithms
- Distance vector Routing Algorithm
- Link state routing Algorithm
- Internet Routing protocols
 - RIP → Routing Information Protocol
 - OSPF → Open Shortest Path First protocol
 - BGP → Border Gateway Protocol

RIP, OSPF and BGP

- Introduction to Hubs, Bridges, Switches, Gateways and Routers

- Introduction to Transport layer Protocols
 - TCP → Transmission Control Protocol
 - UDP → User Datagram Protocol
- Introduction to TCP Protocol
 - Connection Management
 - Flow Control and Retransmission
 - TCP States
 - TCP Header
- TCP and UDP client - server programming

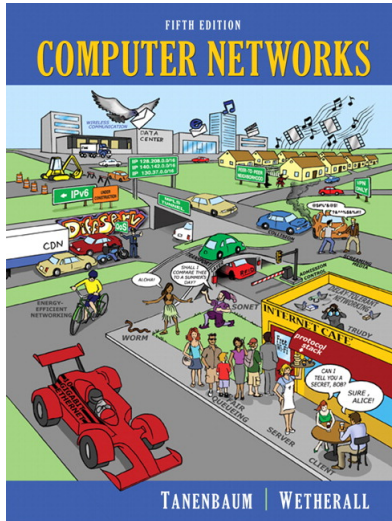
- Introduction to TCP Congestion Control
 - Slow Start
 - Congestion Avoidance
 - Fast Retransmit
 - Fast Recovery
- Congestion Detection Methods:
 - Random Early Detection
 - Explicit Congestion Notification (ECN)

UNIT - VIII: APPLICATIONS OF COMPUTERS NETWORKS IN INDUSTRY

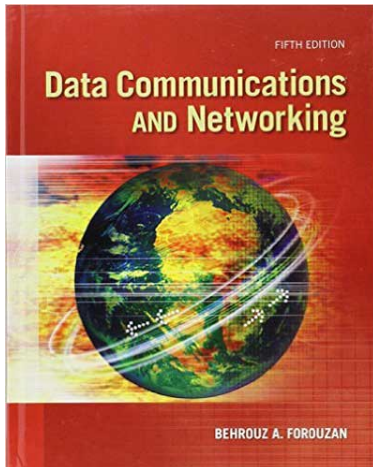


- **Guest Lecture from Industry experts**

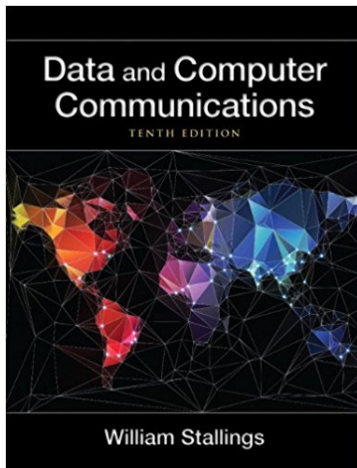
- **Computer Networks, 5th Edition** by Andrew S. Tanenbaum



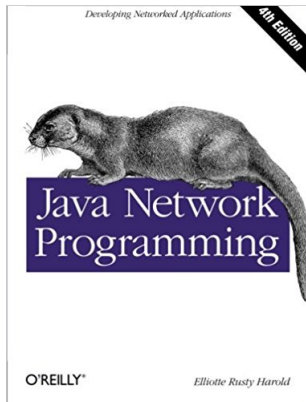
- **Data Communications and Networking, 5th Edition** by Behrouz A Forouzan



- **Data and Computer Communications, 10th Edition** by W. Stallings



- **Java Network Programming, 4th Edition** by Elliottte Rusty Harold



- **Computer Networks and Internets, 10th Edition** by Douglas E. Comer

