COMPUTER NETWORKS (THEORY) CS-422

Pre-requisite: N.A
Credit Hours 03
Contact Hours 48

RECOMMENDED BOOKS

- Data Communications And Networking By Behrouz A Forouzan, 4th Edition, McGraw-Hill Publishing Company Ltd.2006

REFERENCE BOOKS

- Computer Networks By Andrew S. Tanenbuam 4th Edition, Prentice Hall, Pearson Education, Inc, 2003
- Data And Computer Communications By William Stallings 7th Edition, Prentice Hall, Pearson Education,
  Inc, 2004

OBJECTIVE OF COURSE

The objective of the course is to introduce basics of computer networks. In this course we shall explore the issues from local area networks up-to the global Internet and shall study a range of solutions to the associated problem. The course will focus on the TCP/IP protocol suite, however other protocols such as point-to-point/Frame Relay/ATM shall also studied. The emphasis will be on the basic performance and engineering tradeoffs in the design and implementation of computer networks

S.NO	CLO/PLOS MAPPING	DOMAIN	PLO
01	**Describe** fundamental concepts of communication protocols and layered network architectures, especially information related to TCP/IP architecture	C2	01
02	**Outline** different internetworking devices and their functions within a network.	C3	01
03	**Categorize** basic network systems using the standard networking techniques and protocols.	C4	02
04	**Analyze** features, services and operations of various network, transport and application layer protocols of communication stack.	C4	02

COURSE CONTENTS

Data Communication and Networking Fundamentals

- Protocol Architecture
- OSI Reference Model
- The Internet and TCP/IP Protocol Suite

Multiplexing

- Statistical Time Division Multiplexing (STDM)

Switching

- Circuit Switching and Packet Switching
- Virtual Circuit Networks
- Architecture of a Switch

Error Detection and Correction Techniques

- Block Coding
- Hamming Distance
- Cyclic Codes
- Cyclic Redundancy Check (CRC)
- Checksum

Data Link Controls

- Framing, Flow Control and Error Control
- Stop-and-Wait, Go-Back-n and Selective Repeat ARQ

Multiple Access Techniques

- Random Access Techniques
- ALOHA, CSMA, CSMA/CD, CSMA/CA
- Controlled Access Techniques
- FDMA, TDMA, CDMA

Ethernet and Related Standards

- Fast and Gigabit Ethernet

Wireless LANs

- IEEE 802.11 (WiFi)

- IEEE 802.15 (Bluetooth)

Connecting Devices

- Hubs, Repeaters, Switches, Routers and Gateways

Network Layer Logical Addressing

- IPv4 Addressing
- Subnetting, Supernetting and NAT
- IPv6 Addressing
- Internet Protocol (IP)

Internetwork Operation

- Address Mapping and Error Reporting
- ICMP, IGMP and ICMPv6

Transport Protocol

- Process-to-process Delivery
- TCP and UDP

Application Layer Protocols

- WWW, HTTP and FTP
- DNS