**CSE 3103 COMPUTER NETWORKS**

**[3 1 0 4]**

Overview of the Internet, Protocol Layering, Internet History, Introduction to Application Layer, Client Server Paradigm, Standard Client Server Applications, Socket Interface Programming, Introduction to Transport Layer, Transport layer Protocols, UDP, TCP, Introduction to Network Layer, Network Layer Protocols, Unicast and Multicast Routing, Next Generation IP, Introduction to Data Link Layer: Wired Networks, Data Link Control, Multiple Access Protocols, Link Layer Addressing, Wired LANS Ethernet Protocols, Wireless LANS, Other Wireless Networks, Mobile IP, Data and Signals, Digital Transmission, Bandwidth Utilization, Transmission Media.

**References:**

1. Behrouz A. Forouzan,“ “Computer Networks – A Top Down Approach”. Tata McGraw Hill Publication 2012.
2. Behrouz A. Forouzan,“TCP/IP Protocol Suite”, 5th Edition, McGraw Hill Publication.
3. William Stalllings, “Data and Computer Communications”, 8th Edition, PHI Publication.
4. W. Richard Stevens, “UNIX Network Programming”, 3rd Edition, PHI Publication.
5. Larry L.Peterson, Bruce S. Davie, “Computer Networks”, 5th Edition, Morgan Kaufmann Publication.
6. Andrew S. Tannenbaum, “Computer Networks”, 5th Edition, Pearson Education.

**CSE 3103 COMPUTER NETWORKS**

**[3 1 0 4]**

**Pre requisites:**

* A basic course on Design and Analysis of Algorithms and Introduction about Computers.

**Course Objectives:**

* To understand the fundamental concepts of layer level architecture and terminology of computer networking.
* To understand different network protocols, addressing concepts and analyze routing mechanisms in TCP/IP protocol suite..
* To understand the basic services offered by the data link and physical layer.

**Course Outcomes:**

* Ability to identify the role of each layer in offering different services in a computer network.
* Ability to Identify the requirements of the end to end connection oriented and connectionless services like Flow Control, Error Control and Congestion Control issues in Transport Layer.
* Ability to analyze the different routing requirements in Network Layer.
* Ability to distinguish between the requirements of point to point communication and the end to end communication through data link and physical layer services.

1.INTRODUCTION**:**

Overview of the Internet- Networks, Switching,The Internet, Accessing the Internet, Hardware and Software, Protocol Layering – Scenarios, TCP/IP Protocol Suite, The OSI Model, Internet History- Early History, Birth of the Internet, Internet Today.

(Chapter 1 Sections 1.1- 1.3 of Text Book 1) (3 hrs)

**2** APPLICATION LAYER**:**

Providing Services, Application layer Paradigms, Client Server Paradigm- Application Programming Interfacing using services of the Transport Layer, Standard Client Server Application- WWW, HTTP,FTP, Electronic Mail, TELNET, Secure Shell, DNS, Socket Interface Programming- Socket Interface in C.

(Chapter 2 Sections 2.1 – 2.3, 2.5 of Text Book 1). (8 hrs)

**3.** TRANSPORT LAYER:

Introduction – Transport Layer Services, Transport Layer Protocols- Simple Protocol, Stop and Wait Protocol, Go Back N Protocol, Selective Repeat Protocol, Bidirectional Protocol – Piggybacking, Internet Transport Layer Protocols, UDP- User Datagram, UDP Services and Applications, TCP- TCP services, TCP Features, Segment, TCP Connection, State Transition, Windows in TCP, Flow Control, Error Control, TCP Congestion Control, TCP Timers, Options.  
(Chapter 3 Sections 3.1 – 3.4 of Text Book 1) (10 hrs)

**4.** NETWORK LAYER

Network Layer Services, Packet Switching, Network Layer Performance, Network Layer Congestion, Structure of a Router, Network Layer Protocols- IPv4 Datagram Format, IPv4 Addresses, Forwarding of IP Packets, ICMPv4, Unicast Routing- General Idea, Routing Algorithms, Unicast Routing Protocols, Multicast Routing- Introduction, Multicasting Basics, Intradomain Routing Protocols, Interdomain Routing Protocols, Next Generation IP- IPv6, Addressing, Transition from IPv4 to IPv6, ICMPv6. (Chapter 4 Sections 4.1 – 4.5 of Text Book1)  (10 hrs)

**5.** DATA LINK LAYER:

Nodes and Links, Two Types of Links, Two Sub layers, Data Link Control- Framing, Flow and Error Control, Error Detection and Correction, Two DLC protocols, Multiple Access Protocols- Random Access, Controlled Access, Channelization, Link Layer Addressing, Wired LANS Ethernet Protocols- IEEE Project 802, Standard Ethenet. (Chapter 5 Sections 5.1– 5.5.2 of Text Book1) (6 hrs)

**6.** WIRELESS NETWORKS AND MOBILE IP:

Introduction, IEEE 802.11 Project, Other Wireless Networks- Channelization, Satellite Networks, Mobile IP- Addressing, Agents, 3 Phases, Inefficiency in Mobile IP.

(Chapter 6 Sections 6.1 – 6.1.2, 6.2-6.2.1,6.2.3, 6.3-6.3.4 of Text Book1) (4 hrs)

**7.** PHYSICAL LAYER AND TRANSMISSION MEDIA:

Data and Signals- Analog and Digital, Transmission Impairment, Data Rate Limits, Perfomance, Digital Transmission- Digital to Digital Conversion, Analog to Digital Conversion, Bandwidth Utilization- Mutliplexing and Spread Spectrum, Transmission Media- Guided Media and Unguided Media: Wireless.  
(Chapter 7 Section 7.1 – 7.2, 7.4-7.5 of Text Book1) (7 hrs)

**Text Books:**

1. Behrouz A. Forouzan,“ “Computer Networks – A Top Down Approach”. Tata McGraw Hill Publication 2012.
2. Behrouz A. Forouzan,“TCP/IP Protocol Suite”, 5th Edition, McGraw Hill Publication.
3. William Stalllings, “Data and Computer Communications”, 8th Edition, PHI Publication.

**References:**

1. W. Richard Stevens, “UNIX Network Programming”, 3rd Edition, PHI Publication.
2. Larry L.Peterson, Bruce S. Davie, “Computer Networks”, 5th Edition, Morgan Kaufmann Publication.
3. Andrew S. Tannenbaum, “Computer Networks”, 5th Edition, Pearson Education.

**CSE 3113 COMPUTER NETWORKS LAB**

**[ 0 0 3 2]**

**Objectives**

To understand basic concepts and terminology related to network.

To understand the basic concepts for the development of network software

To understand the importance of network monitoring and management

**Outcomes**

• Ability to write client/ server programs using Linux interprocess and socket primitives.

• Install and learn the usage of network monitoring and management tools.

**Experiments**

Implementation of Client\Server programs using Linux interprocess system calls . UDP Based Client Server Programs, TCP Based Client Server Programs, Encapsulation and Decapsulation of IP Packets, Fragmentation, Synchronous Multiplexing using SELECT System Call. Usage of network monitoring tool.

**References:**

1. Behrouz A. Forouzan,“ “Computer Networks – A Top Down Approach”.
2. W. Richard Stevens, “UNIX Network Programming”, 3rd Edition, PHI Publication.
3. Behrouz A. Forouzan,“TCP/IP Protocol Suite”, 5th Edition, McGraw Hill Publication.
4. William Stalllings, “Data and Computer Communications”, 8th Edition, PHI Publication.