CSE 3103: COMPUTER NETWORKS [3 1 0 4]

Course Objectives:

- To understand the fundamental concepts with the basic taxonomy and terminology of computer networking.
- To understand state-of-the-art in network protocols and analyze routing mechanisms in Network Layers.
- To understand the architecture of subnet and applications of Mobile IP.

Course Outcomes:

- Ability to Independently understand basic computer network technology and different protocols in Application Layer.
- Ability to Identify the Flow Control, Error Control and Congestion Control issues in Transport Layer and analyze the different routing technologies in Network Layer.
- Ability to Understand and building the skills of subnet and working of Mobile IP.

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. INTRODUCTION TO APPLICATION LAYER:

Providing Services, Application layer Paradigms, Client Server Paradigm- Application Programming Interface, Using Services of the Transport Layer, Standard Client-Server Applications – WWW and HTTP, FTP, Electronic Mail, TELNET, Secure Shell, DNS, Socket Interface Programming- Socket Interface in C.
(Chapter 2 Sections 2.1, 2.2, 2.3.1-2.3.5, 2.5 of Text Book 1) (8 hrs)

3. INTRODUCTION TO 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) (12hrs)

4. INTRODUCTION TO NETWORK LAYER

Network Layer Services, Packet Switching, Network Layer Performance, Network Layer Congestion, Network Layer Protocols- IPv4 Datagram Format, IPv4 Addresses, ICMPv4, Unicast Routing- General Idea, Routing Algorithms, Multicast Routing- Introduction, Next Generation IP- Packet Format.
(Chapter 4 Sections 4.1.1 – 4.1.4, 4.2.1, 4.2.2, 4.2.4, 4.3.1, 4.3.2, 4.4.1, 4.5.1 of Text Book1) (10hrs)

5. INTRODUCTION TO 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, Multiple Access Protocols- Random Access, Controlled Access, Channelization, Link Layer Addressing, Wired LANS Ethernet Protocols- IEEE Project 802, Standard Ethernet.

(Chapter 5 Sections 5.1, 5.2.1, - 5.2.3, 5.3, 5.4, 5.5.1, 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 6.1.1, 6.1.2, 6.2.1,6.2.3, 6.3 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) (5 hrs)

Text Book:

1. Behrouz A. Forouzan, "*Computer Networks – A Top Down Approach*", McGraw Hill Edition 2012.

References:

1. W. Richard Stevens, "*UNIX Network Programming*", 3rd Edition, PHI 2003 Publication.
2. Larry L.Peterson, Bruce S. Davie, "*Computer Networks*", 5th Edition, 2011 Morgan Kaufmann Publication.
3. Andrew S. Tannenbaum, "*Computer Networks*", 5th Edition, Pearson 2011 Education.
4. Behrouz A. Forouzan,"*TCP/IP Protocol Suite*", 5th Edition, McGraw Hill 2010 Publication.
5. William Stalllings, "*Data and Computer Communications*", 8th Edition, PHI 2011 Publication.