

10B11CI611: Computers Networks

Course Credit: 4

Semester: VI

Introduction

Computer networking is a rapidly advancing field. The Internet is already an integral part of society. It is therefore important for computer scientists and computer engineers to be familiar with the fundamentals of computer networking.

This course will emphasize on the architecture, algorithms, and protocols of the Internet. The format of the course will be lecture-discussions, assignments. Students are strongly encouraged to participate actively in class discussions.

Course Objectives (Post-conditions)

Knowledge objectives:

To study the concepts of communication networks, protocols and their performance.

Application objectives:

On successful completion of this course you will:

- Understand the characteristics and applications of various networking technologies.
- Be able to analyze the protocols used in computer networks.
- Be able to specify the implementation of a simple protocol.

Expected Student Background (Preconditions)

The course will be supplemented by a separate Lab course in which small software-component prototypes will be written in a programming language. Students are assumed to be familiar with programming in C/C++/ Java.

Topics Outline:

S NO	Topics	Hrs
1	Introduction to Computer Networks: Network Software Architecture: layers and protocols, OSI vs. TCP, Network Model, Connection Oriented and Connectionless services, Switching Techniques.	6
2	Physical Layer: Transmission Terminology, Analog and Digital Signal, Transmission Impairments, Transmission Media, Modulation, Network Topology.	4

3	Data Link Layer: Introduction and services to Data Link layer, Error detection and Correction techniques, Multiple access protocol, Ethernet, Hubs and switches, Router and Gateways.	4
4	Network Layer: Network service model, Virtual circuit and Datagram networks, Logical Addressing and Sub-netting, Internet protocol: IPv4 and IPv6, ARP vs RARP, DHCP, Routing algorithms and standards, Internetworking, The network layer in the internet, Broadcast and multicast routing, Congestion Control Algorithms, Queuing theory	8
5	Transport Layer: Transport layer services and principles, End-to-end protocols: Issues and services, Multiplexing and De-multiplexing, Connectionless transport: UDP, Principles of reliable data transfer, Connection-oriented Transport: TCP, Principles of congestion control, TCP Congestion Control.	8
6	Application Layer: Principle of application layer protocols, WWW and HTTP, FTP, SMTP, DNS.	5
7	Some Advanced Topics: Symmetric-key algorithms, Public key algorithms, RSA, Digital Signatures, Communication security, authentication protocols, Web security, Wireless LAN, Mobile IP, Introduction to Multimedia networking, Network management.	7
Total		42

References

Text Books:

1. Andrew S. Tanenbaum, "Computer Networks, Fourth Edition, Prentice Hall India.
2. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet" 3rd Edition Pearson Education.
3. William Stallings, "Data and Computer Communications", Seventh Edition, Prentice Hall of India Publication.
4. B. A. Fourozan, "Data Communications and Networking", 4th Edition, Singapore, McGrawHill, 2004.
5. B. A. Fourozan, "TCP/IP Protocol Suite", 3rd Edition, Singapore, McGrawHill, 2004.
6. Bertsekas D. and Gallager R., Data Networks. Englewood Cliffs, NJ: Prentice-Hall, 1992.

Evaluation Scheme:

S.No	Examination	Marks
1	T-1	15
2	T-2	25
3	T-3	35
4	*Internal Marks	25

*Internal Marks Breakdown:

Assignments 9 marks (3x3)

Quizzes 12 marks (3x4)

Regularity 4 Marks