

COURSE TITLE : **COMPUTER NETWORKS**
COURSE CODE : **4075**
COURSE CATEGORY : **A**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **72**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Introduction and Data Link Layer	17
	Test I	1
2	Network Layer	17
	Test II	1
3	Transport Layer and Application Layer	17
	Test III	1
4	Network Devices and Wireless Technology	17
	Test IV	1
	Total	72

OBJECTIVES

MODULE 1

- 1.1 Introduction to computer networks.
- 1.2 Discuss the advantages of computer networks.
- 1.3 Explain various applications of computer networks.
 - 1.3.1 Discuss Business, Home and Mobile application
- 1.4 Network hardware
 - 1.4.1 Study of broadcast links and point-to-point links.
- 1.5 Overview of ISO-OSI architecture.
- 1.6 Data Link Layer.
 - 1.6.1 Discuss data link layer design issues.
 - 1.6.2 Discuss service provided to network layer.
 - 1.6.3 Explain framing, error control and flow control.
 - 1.6.5 Discuss the role of data link layer in the internet.
 - 1.6.6 Discuss point-to-point protocol.
 - 1.6.7 MAC sub layer
 - 1.6.7.1 Study of channel allocation issues.
 - 1.6.7.1.1 Study of static channel allocation and dynamic channel allocation.
 - 1.6.7.2 Study of Multiple channel allocation.
 - 1.6.7.2.1 Discuss ALOHA, pure ALOHA and slotted ALOHA.
 - 1.6.7.3 Study of CSMA protocols.
 - 1.6.7.3.1 Discuss persistent and non persistent CSMA and CSMA/CD.
 - 1.6.7.3.2 Collision free protocols.
 - 1.6.7.4 Ethernet
 - 1.6.7.4.1 Introduction to Ethernet.
 - 1.6.7.4.2 Study of Ethernet cabling.
 - 1.6.7.4.3 Brief description of IEEE standard for LAN: 802.3,

802.11 and 802.15.

1.6.7.4.4 Study of Switched Ethernet, Fast Ethernet, Gigabit Ethernet.

1.6.8 Study of Logical Link Control

1.6.9 Study of ATM networks.

1.6.9.1 Discuss ATM virtual circuits and ATM reference model.

MODULE 2

2.1 Network Layer.

2.1.1 Discuss Network Layer design issues.

2.1.2 Study of store and forward switching.

2.1.3 Discuss service provided to Transport Layer.

2.1.4 Discuss the implementation of connectionless service and connection oriented service.

2.1.5 Compare virtual circuits and datagram subnets.

2.1.6 Study of Routing Algorithms.

2.1.6.1 Discuss different routing techniques.

2.1.6.2 Explain shortest path routing, flooding, distance vector routing, broadcast routing and multicast routing.

2.1.7 Study of congestion control algorithms.

2.1.7.1 Explain general principles of congestion control.

2.1.7.2 Discuss congestion prevention policies.

2.1.7.3 Discuss congestion control in virtual circuit subnets.

2.1.7.4 Explain techniques for achieving good quality service.

2.1.7.4.1 Discuss over provisioning, buffering, traffic shaping and leaky bucket algorithm.

2.1.8 Study of IP protocol.

2.1.8.1 Study of IPv4 and IPv6.

2.1.8.2 Discuss header structure of IPv4.

2.1.8.3 Discuss IP address format.

2.1.8.4 Discuss subnets.

2.1.8.5 Discuss the structure of IPv6.

2.1.8.6 Explain mobile IP.

MODULE 3

3.1 Study of Transport Layer.

3.1.1 Explain the services provided to upper layers.

3.1.2 Explain transport service primitives.

3.1.3 Discuss the elements of transport protocol.

3.1.3.1 Discuss addressing.

3.1.3.2 Explain connection establishment and connection release.

3.1.4 Discuss flow control and buffering.

3.1.5 Discuss multiplexing.

3.1.6 Discuss crash recovery.

3.2 Study of Application Layer.

3.2.1 Discuss Domain Name Server.

3.2.2 Discuss DNS namespace.

3.2.3 Discuss name servers.

3.2.4 Study of e-mail.

3.2.4.1 Explain e-mail architecture and services.

3.2.4.2 Explain user agent: sending and reading e-mail.

3.2.4.3 Study of message formats.

3.2.4.4 Discuss Multipurpose Internet Mail Extension (MIME).

MODULE 4

- 4.1 Study of Network Management Devices.
 - 4.1.1 Discuss bridges.
 - 4.1.1.1 Discuss local internet working.
 - 4.1.1.2 Discuss spanning tree bridges and remote bridges.
 - 4.1.2 Discuss repeaters, hubs, switches, routers and gateways.
 - 4.1.3 Explain virtual LAN.
 - 4.1.4 Explain wireless access point.
- 4.2 Wireless Technology.
 - 4.2.1 Discuss wireless LAN and WLAN protocols.
 - 4.2.2 Discuss MACA and MACAW.
 - 4.2.3 Discuss 802.11 protocol stack and 802.11 services.
 - 4.2.4 Study of Broadband wireless.
 - 4.2.4.1 Discuss wireless MAN (802.16 standard).
 - 4.2.4.2 Discuss 802.16 protocol stack.
 - 4.2.4.3 Compare wireless LAN and wireless MAN(802.11 with 802.16).
 - 4.2.5 Study of blue tooth.
 - 4.2.5.1 Discuss blue tooth architecture, blue tooth protocol stack and blue tooth applications.
- 4.3 Discuss commonly used protocols.
 - 4.3.1 Brief discussion of User Datagram Protocol (UDP), HTTP (Hyper Text Transfer Protocol), FTP (File Transfer Protocol), TCP (Transmission Control Protocol), Wireless TCP and UDP, SMTP, POP3, TelNet, VOIP.

CONTENT OUTLINE

MODULE I

Computer n/w-applications-overview of ISO-OSI architecture-Data link layer-framing-error control-flow control-MAC sub layer-Aloha-CSMA-CSMA/CD-Ethernet-LLC-ATM networks

MODULE II

Network layer – routing algorithms-congestion control algorithms-IP protocol –IP 4 and IP 6

MODULE III

Study of transport layer- flow control- crash recovery-Application layer- DNS-email

MODULE IV

Network management service- Virtual LAN- Wireless Access Point-IEEE 802.11 standard- blue tooth-commonly used protocols

TEXT BOOK:

1. Data and Computer Communications – William Stallings, Pearson
2. Computer Networks (Fourth Edition) – Andrew S. Tanenbaum, Pearson