

**CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF TECHNOLOGY&ENGINEERING**  
**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**CS352: COMPUTER NETWORKS**

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**Credits and Hours:**

Teaching Scheme	Theory	Practical	Tutorial	Total	Credit
Hours/week	3	2	-	5	4
Marks	100	50	-	150	

**A. Objective of the Course:**

The main objectives for offering the course Computer Networking are:

- To explain the concepts of data communications.
- To teach the functions of different layers of OSI model.
- To introduce IEEE standards employed in computer networking.
- To make the students to get familiarized with different protocols and network components.

**B. Outline of the course:**

Sr. No.	Title of the unit	Minimum number of hours
1	Introduction to Computer Networks	04
2	Data Link Layer	08
3	Medium Access Control Sub Layer	10
4	Network Layer	12
5	Transport Layer	08
6	Application Layer	03

**Total hours (Theory): 45**

**Total hours (Lab): 30**

**Total hours: 75**

### **C. Detailed Syllabus:**

<b>1</b>	<b>Introduction to Computer Networks</b>	<b>04 Hours</b>	<b>09%</b>
1.1	Uses of computer network, brief on Internet, applications and recent trends on computer networks		
1.2	Network hardware, network software		
1.3	OSI model, TCP/IP model, Comparison of OSI and TCP/IP model		
1.4	Example network		
<b>2</b>	<b>Data Link Layer</b>	<b>08 Hours</b>	<b>18%</b>
2.1	Design Issues		
2.2	framing, error control, flow control		
2.3	Error detection and correction		
2.4	Elementary data link protocols		
2.5	simplex, stop and wait, sliding window protocol, HDLC		
<b>3</b>	<b>Medium Access Control Sub Layer</b>	<b>10 Hours</b>	<b>22%</b>
3.1	The channel allocation problem, Multiple Access protocols: ALOHA, CSMA, Collision Free Protocols,		
3.2	Limited Contention Protocols, Wavelength Division Multiple Access Protocols		
3.3	Wireless LAN protocols; Ethernet: Traditional Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.2: LLC, Data link layer switching		
<b>4</b>	<b>Network Layer</b>	<b>12 Hours</b>	<b>27%</b>
4.1	Implementation of connection oriented and connection less service, Comparison of virtual circuit and datagram subnets, Routing algorithms		
4.2	Shortest path routing, Flooding, Distance vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing, Routing for mobile host		
4.3	Routing in ad hoc network, Congestion control algorithms principles, Prevention policies		
4.4	Congestion control in virtual circuit subnets, Congestion control in		

- datagram subnets, Load shedding,
- 4.5 Virtual circuit, Connectionless internetworking, Tunneling,  
Internetwork routing and fragmentation
- 4.6 The network layer in the internet: The IP protocol, discuss IPv4 & IPv6, IP addresses
- 4.7 Internet control protocol, OSPF, BGP
- 5 Transport Layer 08 Hours 18%**
- 5.1 The transport service: Services provided to the upperlayers
- 5.2 Transport service primitives, Socket elements of transport protocols  
addressing
- 5.3 Connection establishment, Connection release, Flow control
- 5.4 Multiplexing, Crash recovery the transport protocol: UDP, TCP,  
comparative study on TCP and UDP
- 6 Application Layer 03 Hours 06%**
- 6.1 DNS: The DNS name space, Resource records, Nameservers
- 6.2 Electronic mail: Architecture and services
- 6.3 World Wide Web: Architectural overview, HTTP, web services

#### **D. Instructional Method and Pedagogy:**

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and laboratory which carries 5 Marks weightage.
- Two internal exams will be conducted and average of the same will be converted to equivalent of 15 Marks as a part of internal theory evaluation.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5 Marks as a part of internal theory evaluation.
- Surprise tests/Quizzes/Seminar will be conducted which carries 5 Marks as a part of internal theory evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments/Tutorials related to course content will be carried out in the laboratory.

## **E. Student Learning Outcomes:**

After completion of the course students will be able to

- To differentiate in terms of working between various IEEE standards related to networking.
- To implements various tools related to Network Management.
- To design network architecture having good throughput and less delay.

## **F. Recommended Study Material:**

### **❖ Text Books:**

1. Computer Network, Andrew S. Tanenbaum, Prentice Hall PTR

### **❖ Reference Books:**

1. Introduction to Data Communication and Networking by Behrouz Forouzan, McGraw Hill
2. Data and Computer Communications, William Stallings, Prentice Hall

### **❖ Reference Books:**

1. <http://www.cisco.com>
2. <http://compnetworking.about.com>