

Computer Network(CSC 503)

Shilpa Ingoley

Lecture 1

Course Code:	Course Title	Credit
CSC503	Computer Network	3



Course Objectives

To introduce concepts and fundamentals of data communication and computer networks.

To explore the inter-working of various layers of OSI.

To explore the issues and challenges of protocols design while delving into TCP/IP protocol suite.

To assess the strengths and weaknesses of various routing algorithms.

To understand various transport layer and application layer protocols.



Course Outcomes:

On successful completion of course, learner will be able to -

Demonstrate the concepts of data communication at physical layer and compare ISO - OSI model with TCP/IP model.

Explore different design issues at data link layer.

Design the network using IP addressing and sub netting / supernetting schemes.


Analyze transport layer protocols and congestion control algorithms.

Explore protocols at application layer

Module		Content	Hrs
1		Introduction to Networking	4
	1.1	Introduction to computer network, network application, network software and hardware components (Interconnection networking devices), Network topology, protocol hierarchies, design issues for the layers, connection oriented and connectionless services	
	1.2	Reference models: Layer details of OSI, TCP/IP models. Communication between layers.	
2		Physical Layer	3
	2.1	Introduction to Communication Electromagnetic Spectrum	
	2.2	Guided Transmission Media: Twisted pair, Coaxial, Fiber optics.	
3		Data Link Layer	8
	3.1	DLL Design Issues (Services, Framing, Error Control, Flow Control), Error Detection and Correction(Hamming Code, CRC, Checksum) , Elementary Data Link protocols , Stop and Wait, Sliding Window(Go Back N, Selective Repeat)	
	3.2	Medium Access Control sublayer Channel Allocation problem, Multiple access Protocol(Aloha, Carrier Sense Multiple Access (CSMA/CD)	

4		Network layer	12
	4.1	Network Layer design issues, Communication Primitives: Unicast, Multicast, Broadcast. IPv4 Addressing (classfull and classless), Subnetting, Supernetting design problems ,IPv4 Protocol, Network Address Translation (NAT), IPv6	
	4.2	Routing algorithms : Shortest Path (Dijkstra's), Link state routing, Distance Vector Routing	
	4.3	Protocols - ARP,RARP, ICMP, IGMP	
	4.4	Congestion control algorithms: Open loop congestion control, Closed loop congestion control, QoS parameters, Token & Leaky bucket algorithms	
5		Transport Layer	6
	5.1	The Transport Service: Transport service primitives, Berkeley Sockets, Connection management (Handshake), UDP, TCP, TCP state transition, TCP timers	
	5.2	TCP Flow control (sliding Window), TCP Congestion Control: Slow Start	
6		Application Layer	6
	6.1	DNS: Name Space, Resource Record and Types of Name Server. HTTP, SMTP, Telnet, FTP, DHCP	

Textbooks:	
1	A.S. Tanenbaum, Computer Networks , 4 th edition Pearson Education
2	B.A. Forouzan, Data Communications and Networking , 5 th edition, TMH
3	James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet , 6 th edition, Addison Wesley
References:	
1	S.Keshav, An Engineering Approach To Computer Networking , Pearson
2	Natalia Olifer & Victor Olifer, Computer Networks: Principles, Technologies & Protocols for Network Design , Wiley India, 2011.
3	Larry L.Peterson, Bruce S.Davie, Computer Networks: A Systems Approach , Second Edition ,The Morgan Kaufmann Series in Networking



Useful Links

- 1 <https://www.netacad.com/courses/networking/networking-essentials>
- 2 <https://www.coursera.org/learn/computer-networking>
- 3 <https://nptel.ac.in/courses/106/105/106105081>
- 4 <https://www.edx.org/course/introduction-to-networking>

Assessment:**Internal Assessment:**

Assessment consists of two class tests of 20 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 40% syllabus is completed. Duration of each test shall be one hour.

End Semester Theory Examination:

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| 1 | Question paper will comprise of total six questions. |
| 2 | All question carries equal marks |
| 3 | Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3) |
| 4 | Only Four question need to be solved. |
| 5 | In question paper weightage of each module will be proportional to number of respective lecture hours as mention in the syllabus. |

Certification



CCNA



CCNP



CCIE
Certification



CompTIA

Job titles

- Network administrator .
- Network engineer .
- Network architect .
- Network manager .
- Network analyst.
- Wireless network engineer.
- Network Solutions Architect.
- Network Programmer.
- Wireless Network Engineer
- IT consultant.
- Computer technician.
- Help desk technician.
- System engineer.
- Network support specialist.