

SYLLABUS

Course Code: CSE1004		Course Title: Network and Communication	L, T, P, J, C 2, 0, 2, 4, 4	
Objectives		1. Build an understanding of the fundamental concepts of computer networking, protocols, architectures, and applications 2. Gain expertise in design, implement and analyze performance perspective of ISO-OSI layered Architecture 3. Deal with the major issues of the layers of the model. 4. Implement new ideas in Networking through semester long projects 5. Take advanced courses in Networking		
Expected Outcome		After successfully completing the course the student should be able to 1. Describe the layered structure of a typical networked architecture 2. Identify and analyze the different types of network topologies, switching, error and flow control mechanisms 3. Design sub-netting and enhance the performance of routing mechanisms. 4. Compare various congestion control mechanisms and identify suitable Transport layer protocol for real time applications 5. Identify various Application layer protocols for specific applications		
Module	Topics		L Hrs	S LO
1	Networking Principles and layered architecture Data Communications and Networking: A Communications Model – Data Communications - Evolution of Network, Requirements, Applications, Network Topology (Line configuration, Data Flow), Protocols and Standards, Network Models (OSI, TCP/IP)		4	2
2	Circuit and Packet switching Switched Communication Networks – Circuit Switching – Packet Switching – Comparison of Circuit Switching and Packet Switching – Implementing Network Software, Networking Parameters (Transmission Impairment, Data Rate and Performance)		5	2
3	Data link layer Error Detection and Correction – Hamming Code, CRC, Checksum - Flow Control Mechanism – Sliding Window Protocol - GoBack - N - Selective Repeat - Multiple access Aloha - Slotted Aloha - CSMA, CSMA/CD – Multiple Access Networks (IEEE 802.3), Token Ring(IEEE 802.5) and Wireless Networks (IEEE 802.11, 802.15)		5	5
4	Network Layer IPV4 Address Space – Notations – Classful Addressing – Classless Addressing – Network Address Translation – IPv6 Address Structure – IPv4 and IPv6 Header Format		4	5,7
5	Routing Protocols Routing - Link State and Distance Vector Routing Protocols - Implementation - Performance Analysis - Packet Tracer		3	5

6	Transport Layer TCP and UDP - Congestion Control – Effects of Congestion - Traffic Management - TCP Congestion Control – Congestion Avoidance Mechanisms - Queuing Mechanisms - QoS Parameters	6	5
7	Application Layer and Network Security Application layer : Domain Name System - Case Study : FTP - HTTP-SMTP-SNMP Network Security : Cryptography, Network layer security (IPSec), Transport Layer Security (TLS/SSL, HTTPS)	3	6
List of Experiments I Hardware Demo <ul style="list-style-type: none"> Demo session of all networking hardware and Functionalities II OS Commands <ul style="list-style-type: none"> Network configuration commands using Linux III Implementation using C <ul style="list-style-type: none"> Error detection and correction mechanisms Flow control mechanisms IP addressing – Classless addressing IV Packet Tracer <ol style="list-style-type: none"> Observing Packets across the network and Performance Analysis of Routing protocols V Socket programming <ol style="list-style-type: none"> Socket programming(TCP and UDP) – Multi client chatting VI Networking Simulation Tool <ol style="list-style-type: none"> Simulation of unicast routing protocols Simulation of Transport layer Protocols and analysis of congestion control techniques in network Develop a DNS client server to resolve the given host name or IP address Implementation of Layers for security protocols - SSL/TLS 			2,6 2 5 5 5 7,14 2,7 2,17 2,17 2,5 5
Project <ul style="list-style-type: none"> Generally a team project [2 to 3members]. Concepts studied in Computer Networks should have been used Innovative idea should have been attempted. Sample : 1. Design and Implementation of point-to-point networks. 2. A platform for distributing computation onto volunteer nodes. <ul style="list-style-type: none"> Report in Digital format with proposed idea, software package, coding and results to be submitted. Assessment on a continuous basis with a minimum of 3 reviews. Study Experiment: Memos in the Requests for Comments (RFC) document series contain technical and organizational notes about the Internet. They cover many aspects of computer networking including protocols, 		60 [Non Contact hrs]	2,5,6,7,8,9,13,17,18

procedures, programs, and concepts, as well as meeting notes and opinions. RFCs are available in ietf.org and from rfc-editor.org. Take a look at the RFCs and write review report on any RFC, which is not in ' <i>historic</i> ' and ' <i>unknown</i> ' status.		
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Text / Reference

Text Books

1. Computer Networks: A Systems Approach, Larry Peterson and Bruce Davie, 5th Ed, The Morgan Kaufmann Series, Elsevier, 2011.
2. Computer Networking: A Top-Down Approach Featuring the Internet, J.F.Kurose and K.W.Ross, 6th Ed., Pearson Education,2012.

Reference Books

3. Data Communications and Networking, Behrouz A. Forouzan, McGraw Hill Education, 5th Ed., 2012
4. TCP/IP Protocol Suite, Behrouz A. Forouzan, McGraw-Hill Education, 4 Ed., 2009
5. Data and Computer Communications, William Stallings, Pearson Education,10th Ed,2013.
