EC-330 Computer Networks - Course Contents

Increase in Credit Hours (Theory)

a. **Credit Hours:** 3+1

b. **Text Book:** Data and computer communications –By William Stallings 7th Edition.

c. **Reference Books:**

1. Advanced Computer Networks by Tenenbaum.
2. Computer Networks and Internets by Douglas E. Comer.

d. **Course Objectives:**

The overall objective is to develop a thorough understanding of the principles and techniques employed in local and wide area computer communication networks and the OSI reference model, particularly concentrating on data link, network and transport layers. Following are the main objectives of the course:

i. Enable students to understand how bit streams are transmitted physically over guided and unguided media.
ii. An ability to design LAN/WAN networks and analyze their performance by simulating the network using OPNET and monitoring performance using Etherial.
iii. To develop understanding of the communication protocols used in Internet.
iv. Ability to design and analyze MAC, Routing and Transport layer protocols for different networks.
v. Network programming skills are developed using socket to implement various applications based on client/server paradigm or peer-to-peer communication.
vi. Provide a rigorous and comprehensive introduction to TCP/IP protocol stack.
vii. Introduce the emerging networking technologies.

e**. Outcomes:** At the end of this course,

i. The students will have adequate knowledge of fundamental techniques of computer networks particularly internet.

ii. They will be able to design protocols and implement in ns-2 for the evaluation of their proposed design.

f. **Contents:**

(1) Introduction, Communication Model, Data Communications, Data Communication Networking, Protocols and Protocols Architecture, Standards

(2) Introduction to Web Server, DNS, File Server, Exchange Server and Database Server.

(3) Introduction to workgroup and domain setup.

(4) Guided Transmission Media, Wireless Transmission, Flow Control, Error Detection, Error Control, Transmission Impairments, Multiplexing techniques.

(5) Flow Control, Error Control, HDLC, Other Data link Control Protocols, Switched Networks

(6) Circuit-Switching Networks, Switching Concepts, Routing in Circuit-Switching Networks

(7) Packet-Switching Principles, Datagram, Virtual Circuit

(8) Congestion Control, Routing, Chock Packet, ICMP

(9) X.25 Layer Structure, Frame Relay Protocol Architecture, ATM Protocol.

(10) LAN Architecture, Bus/Tree LANs, Ring LANs

(11) Ethernet and Fast Ethernet (CSMA/CD)

(12) Token Ring and FDDI, ETR

(13) ATM Protocol Architecture and Services

(14) Bridge, Switch and Hub Operations

(15) Transport Services, Router, RIP, OSPF and distance vector

(16) Principles of Internetworking, Gateways

(17) Overview of ISDN, ISDN Channels

(18) Network Management, Network Security implementations

(19) ISDN layer structure and Protocols

(20) ADSL, HDSL, and other DSL’s

a. **Details of lab work/workshop practice, if applicable**

S.No.	Lab Title	Software
1.	Introduction to Network Hardware and TCP/IP	Windows Server 2003
2.	Installation and Configuration of Domain Name Service (DNS)	Windows Server 2003
3.	DNS/Installation and Configuration of Internet Information Services (IIS)	Windows Server 2003
4.	Installation and configuration of Domain Controller for Local Area Network	Windows Server 2003
5.	Configuring Organizational Units (OUs) to represent business structure	Windows Server 2003
6.	Configuring and Testing Security policies on Domain Network	Windows Server 2003
7.	Introduction to TCP/IP Addressing and Configuration of DHCP (Dynamic Host Control Protocol)	Windows Server 2003
8.	Configuring Routers using classfull IP addressing	Windows Server 2003
9.	Configure Routing using CIDR (Classless Inter Domain Routing)	Windows Server 2003
10.	Configure VLSM(Variable Length Subnet Mask) and NAT(Network Address Translation)	Windows Server 2003

11.	Virtual Private Network (VPN)	Windows Server 2003
12.	Configuring RADIUS Server for VPN access	Windows Server 2003
13.	Revision	Windows Server 2003