

# COMPUTER NETWORKS

3<sup>RD</sup> year course with practical classes

## *LECTURES*

### **1. Introduction:**

Plan of lectures and labs, assignments and their deadlines/scores.

A Communications model, Data Communications and Networking, Computer communications Architecture, Accepted Standards.

### **2. Data Communications:**

Analog and Digital Data Transmission

#### **Digital Data Communication Techniques:**

Asynchronous and Synchronous Transmission, Error Detection Techniques, *Interfacing*

### **3. Data Link Control:**

Line Configurations, Flow Control, Error Control, Data Link Control Protocols.

### **4. Data Communication Networking:**

#### ***Circuit Switching***

*Communication Networks, Circuit Switching, Single Node Networks, Digital Switching, Control Signalling.*

#### **Packet Switching:**

Packet Switching Principles, Example Systems, Datagrams, Virtual Circuits, Routing.

### **5. Data Communication Networking:**

#### ***Local and Wide Area Networks***

LAN/WAN Technology and Standards, Bus Tree, Star and the Ring Topologies; Baseband, Broadband, Optical Fiber cabling

## 6. Computer Communication Architecture:

### *Hub Technology:*

Subnets, Hubs, Hosts and Clients, IP Addresses, Domain Name Services.

### *Ethernet, Fast Ethernet LANs*

## 7. Computer Communication Architecture

S Protocols, Layers approach, OSI Model

## 8. Internetworking (INW)

Principles of Internetworking, Bridges, Routers, Connectionless Internetworking, *Protocol Standards*, Router-level Protocols, Connection-oriented INW. Domain Name Services in Linux.

## 9. Computer Communication Architecture :

### *Transport Protocols*

Transport Services, Protocol Mechanisms, ISO Transport Standards, TCP and UDP..

### *9. TCP/IP protocol suite, its headers and applications*

## 11. Computer Communication Architecture:

### *Session services. Presentation Facilities*

*Abstract Syntax Notation, Encryption and Authentication Codes, Virtual Terminal Protocol: TELNET, ISO Standards.*

## *11. Distributed Applications*

Network Management (*Systems Network Architecture (SNA;)* *Internet Simple Message Protocol (ICMP).*)

File Transfer, Electronic Mail.

## 12. Grid and larger network technologies:

### *Peer-to-peer networks and grid technologies*

Grid Taxonomy, Lookup and discovery servers

## Requirements and deadlines:

### a. Assignments (10 %):

- i. N1- Packets propagation – by 1/11/02 by 5 pm (5%)
- ii. N2 - Network routing – by 29/11/02 by 5 pm (5%)

### b. Laboratory exercises (50%):

- i. N1- Basics of Linux System Administration – 14/10/02 (4%)
- ii. N2 - Linux Domain Name Service – 28/10/02 (10%)
- iii. N3 – Access and share files from Windows – SAMBA – 4/11/02 (8 %)
- iv. N4- Apache: serving the World Wide Web – 11/11/02 (8 %)
- v. N5- NFS, FTP and Host-level security – 18/11/02 (10 %)
- vi. N6- Service-level and Network-level security – 25/11/02 (10 %)
- vii. Any missed labs – to be reported by the 16/12/02, 5 pm as latest.

### c. Recommended books:

- i. Stallings, William: *Data and Computer Communications*, London Prentice Hall International, 1997
- ii. Stallings, William: *Data and Computer Communications*, London Prentice Hall International, 2000
- iii. Tannenbaum, Andrew: *Computer Networks*, London Prentice Hall International, 1996
- iv. Tannenbaum, Andrew: *Computer Networks*, London Prentice Hall International, 1999
- v. Held, Gilbert: *Understanding Data Communications*, Indianapolis, Ind New Riders, 1999
- vi. **A taxonomy and survey of grid resource management systems for distributed computing**  
*Krauter K.; Buyya R.; Maheswaran M..* Softw. Pract. Esper., 2002, 32
- vii. [http://www.ibiblio.org/pub/Linux/docs/HOWTO/other-formats/html\\_single/](http://www.ibiblio.org/pub/Linux/docs/HOWTO/other-formats/html_single/)
- viii. [http://www.ibiblio.org/pub/Linux/docs/HOWTO/other-formats/html\\_single/DNS-HOWTO.html](http://www.ibiblio.org/pub/Linux/docs/HOWTO/other-formats/html_single/DNS-HOWTO.html)
- ix. <http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnmag01/html/netpeers.asp/>
- x. <http://www.eu-datagrid.org>