



**Course Code: CSE3003**

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**Course Title: Computer Networks**

**R.Nandha kumar**

# Syllabus

<b>Module No. 1</b>	<b>Introduction</b>	<b>6 Hours</b>
Computer network and its history, progress and application, Internet, Network architecture, Networking devices. OSI Model, TCP/IP Protocol stack, Networking in different OS.		
<b>Module No. 2</b>	<b>Physical Layer</b>	<b>8 Hours</b>
Data communication technologies, Analog and digital communication. Encoding mechanisms, Packet Switching, Circuit Switching.		
<b>Module No. 3</b>	<b>Data Link Layer</b>	<b>8 Hours</b>
Framing, HDLC, PPP, Error detection, Error Correction, MAC Protocols, Reliable Transmission, Ethernet, 802.3, 802.5, 802.11, PPP, ATM.		
<b>Module No. 4</b>	<b>Network Layer</b>	<b>7 Hours</b>
IP addressing schemes, IPV4, Subnetting, IPV6, shift from IPV4 to IPV6, ICMP, DHCP, ARP. Routing Protocols: Distance-vector and link-state routing. RIP, OSPF, BGP Multicasting.		
<b>Module No. 5</b>	<b>Transport Layer</b>	<b>8 Hours</b>
Connection Oriented and connection less service, TCP and UDP, Port Addressing, Remote Procedure Call, Flow Control vs Congestion Control, Quality of Service.		
<b>Module No. 6</b>	<b>Application Layer Protocols</b>	<b>8 Hours</b>
Application Layer Protocols: World wide web and HTTP, HTTPS, Domain names: DNS, File Transfer: FTP, Electronic mail: SMTP, Peer to peer networking, Torrent, VPN, Session management. Data compression techniques.		

# CAT - I

## Introduction

Computer network and its history  
progress and application  
Internet  
Network architecture  
Networking devices  
OSI Model  
TCP/IP Protocol stack  
Networking in different OS.

## Physical Layer

Data communication  
technologies  
Analog and digital  
communication  
Encoding mechanisms  
Packet Switching  
Circuit Switching

## Data Link Layer

Framing  
HDLC  
PPP  
Error detection  
Error Correction



# Network Operating Systems

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- Computer network is to allow users
  - to **share resources** located on other computers,
  - to **share peripheral hardware** devices such as printers and fax machines, and
  - to **communicate electronically**.
- A *network operating system* (NOS)
  - It is a specialized operating system designed
  - to provide networking functionality.
- The most widely used network operating systems today include
  - Microsoft Windows Server,
  - Novell Open Enterprise Server, and various flavours of UNIX.

# Functions of NOS

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- Creating and managing network user accounts
- Configuring and managing network resources
- Controlling access to network resources
- Providing communication services
- Monitoring and troubleshooting the network

# Network Operating System

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- It is deployed on network servers
  - to enable administrators
  - to manage network resources such as
    - data storage areas,
    - network printers and
    - communication services.



# Network Operating System

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- Most organisations are increasingly dependent
- On computing services, and also partly due
  - to the phenomenal growth of the Internet and
  - the World Wide Web
- The number of users on a typical enterprise LAN is growing almost daily.
- Keeping track of all these users and the resources
  - Their need is becoming increasingly
    - difficult,
    - time consuming and
    - costly.
- NOS ability to create and manage user accounts effectively.

# Network Operating System

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- One of the first **tasks of the network administrator** will be
  - to **create a directory services** structure and
  - a **network file system**.
- NOS provides the required functionality



# Other facilitated by NOS

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- Implementation of network security policies,
- Optimisation of system performance,
- Backing up and restoring data,
- Installing and configuring distributed applications, and
- Monitoring and managing network usage and performance.

# OS

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- Determine **which application can use the CPU** at any given time, and
- Ensure that **processor time** is fairly allocated between multiple processes.
- It will also **manage the use of main memory** and secondary storage,
- Control access to hardware, and
- Provide a user interface.
- **NOS has similar functionality,**
  - but also **enables applications** running on different computers
  - to communicate with each other.

# OS

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- Operating systems have tended to fall into one of two categories in the past - either
    - Multi-user systems such as UNIX or Linux, or
    - Single-user desktop systems such as MS-DOS.
  - GUI-based desktop operating systems such as
    - Windows 95 and its descendants have increased the functionality of desktop systems to include multi-tasking
  - UNIX was designed from the start
    - to support networking,
  - while modern desktop operating systems have adapted to a networking environment.



# Unix / Windows

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- The necessary functionality required
  - to **configure and manage** a client-server network of any size,
  - it is necessary to employ a **fully-featured** and
  - **scalable** network operating system.
- These powerful and network-oriented operating systems will be installed on network servers
  - to provide centralised management of network resources and
  - network security.

# NOS

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- Appropriate software must also be installed on client computers
  - to allow users to log on to a server and access network resources.
  - The client software allows legitimate users of the network
    - to authenticate themselves by providing a valid username and password.
- Network operating systems are defined by their ability
  - to maintain information about all of the resources on the network, and
  - to provide a comprehensive range of network management facilities.

# Contents and copyrights

- Digital House appliances Forum, 2002
- Digital information are easy to copy
  - Network enables sharing of the information
- Digital copyright protection
  - CSS (Contents scramble system)
  - AEA (Advanced Encryption standard)
  - CPPM (Content Protection for Prerecorded Media)
  - CPRM (Content Protection for Recordable Media)
  - DTCP (Digital Transmission Content Protection)
  - DDCCP (High-bandwidth Digital Content Protection )



