



Course Name: Computer Systems and Networks

(UG/PG): UG, Semester 4

Number of Credits: 4 (60 Hrs)

Level: 2

Introduction

The course covers the elements, evolution and history of networking. These concepts give an insight to the detailed working of networks and telecommunication, its architecture and design. The paper also covers the different types of software which are being used and their applications.

The later sections of this course deal with network layers. This helps the students get an insight into how the data transfer takes place on the network, whether on a small scale or on a global scale. The paper also explains the concept of database management and simple queries which can be used to retrieve information in many methods.

A. Objectives

1. To introduce students to the basics of contemporary computer systems, their internal architecture, the historical background of their evolution.
2. To provide a background of enterprise class systems used in business applications, the internet, their different implementations, their scalability.
3. To introduce and familiarize students to the fundamentals of networks, particularly Ethernet based networks, the different standards and protocols associated with them, their internals, their design and practical implementation in SOHO and enterprise environments.

At the end of the course the students are expected to:

- a) Know the basics of computer and software systems architectures and networks.
- b) Comprehend the historical development of computer and network architectures, particularly from the point of view of why and not just how
- c) Having a working knowledge of Ethernet related protocols, storage network related protocols, network addressing, subnets, network switching and network routing.

Pedagogy:

- Verbal teaching with the help of audio visual aids

- Practical examples shown in the classroom, wherever applicable
- Self-study forms a part of the teaching pedagogy
- Practical sessions in the computer lab, which include carrying out the examples of programs covered as per the subject, in the course contents and theory sessions.

Course Outline

S.No.	Topic	Hours
1.	<p>Unit 1 – A Study of Modern Computer Architecture Internals</p> <p>Examination of enterprise class server architecture</p> <ul style="list-style-type: none"> ○ An overview of the different components ○ A Glimpse into the repeatability of concepts related to the design 	6 hrs
2.	<p>Unit 2 – A Bottoms-Up Look at Computer Architecture Evolution</p> <p>From calculators to multi-node computer grids</p> <ul style="list-style-type: none"> ○ Detailed discussion on the evolution of microprocessor architectures ○ Examination of the driving forces in the evolution of microprocessor architectures and their possible application to overall computer architectures. ○ Lab Visit 	8 hrs
3.	<p>Unit 3 – Computer Software Systems</p> <ul style="list-style-type: none"> ○ An overview of desktop applications ○ Overview of business applications ○ Technical underpinnings of enterprise class business applications ○ Scalability, security and other considerations 	10hrs
4.	<p>Unit 4 – Fundamentals of Networks</p> <ul style="list-style-type: none"> ○ Introduction to Networks – what are networks, the need for networks, types of networks ○ Data and the Network – Protocols – What are they ○ Ethernet ○ Other standards and protocols ○ Lab – Packet Capture and Analysis 	10 hrs
5.	<p>Unit 5 – OSI – The Network Model</p> <ul style="list-style-type: none"> ○ The different layers of OSI ○ Relevance of the different OSI Layers 	4hrs

6.	<p>Unit 6 – MAC Layer and TCP/IP (6 hours)</p> <ul style="list-style-type: none"> ○ MAC Layer – Fundamentals, Ethernet MAC addressing, unicast, multicast, broadcast, Ethernet header examination, LAN, MTU, standards ○ IP Layer – Fundamentals, IP Addressing, Subnets, different classes of subnets, IPv4, IPv6, IP header examination, IP forwarding, standards and RFCs ○ TCP and UDP Layers – Reliable and Unreliable communication, Ports, association of ports and applications, TCP / UDP header examination, standards and RFCs 	8 hrs
7.	<p>Unit 6- Structured Query Language (SQL))</p> <ul style="list-style-type: none"> ○ Introduction ○ History of SQL ○ Basic Structure ○ DDL Commands ○ DML Commands ○ Simple Queries ○ Nested Queries ○ Aggregate Functions ○ Clauses 	12 hrs
	<p>Unit 7 – Network Switching and Routing</p> <ul style="list-style-type: none"> ○ Layer 2 Switching ○ Layer 3 Routing ○ Networks in Grid Computing 	6 hrs

Evaluation:

Continuous Assessments (CA): At least 4 components to be conducted through the semester along with Attendance & Class Participation with minimum 60 and maximum 80 marks

- Regularity of attendance
- Extent of class participation

Semester End Evaluation (SEE): At least 2 components with minimum 20 and maximum 40 marks