# SILVER OAK UNIVERSITY

## College of Technology (01)

**Bachelor of Technology in (CE-CC/CE-MLAI) Engineering**
**Subject Name: Computer Networks**
**Subject Code: 1010063216**
**Semester: 4th**

**Prerequisite:**

1. Data structure and operating system.

**Objective:**

The main objectives for offering the course Computer Networking are:

1. To explain the concepts of data communications.
2. To teach the functions of different layers of OSI models.
3. To make the students to get familiarized with different protocols and network components.

**Teaching and Examination Scheme:**

| Teaching Scheme | | | | | Evaluation Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Theory | | Practical | | |
| L | T | P | Contact Hours | Credit | CIE (TH) | ESE (TH) | CIE (PR) | ESE (PR) | |
| 3 | 0 | 2 | 5 | 4 | 40 | 60 | 20 | 30 | 150 |

**Content:**

| Unit No. | Course Contents | Teaching Hours | Weightage % |
|---|---|---|---|
| 1 | Introduction to Computer Networks:<br><br>Uses of computer network, network hardware, network software, OSI model, TCP/IP model, Comparison of OSI and TCP/IP model. | 5 | 15% |
| 2 | Data Link Layer<br><br>Design Issues , framing, error control, flow control, Error detection and correction, Elementary data link protocols, simplex, stop and wait, sliding window protocol, HDLC | 5 | 15% |
| 3 | Medium Access Control Sublayer | 5 | 15% |

| | | | |
|---|---|---|---|
| | The channel allocation problem, Multiple Access protocols: ALOHA, CSMA, Collision Free Protocols, Limited Contention Protocols, Wavelength Division Multiple Access Protocols, Wireless LAN protocols; Ethernet: Traditional Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.2: LLC, Data link layer switching | | |
| 4 | Network Layer<br><br>Implementation of connection oriented and connection less service, Comparison of virtual circuit and datagram subnets, Routing algorithms ,Shortest path routing, Flooding, Distance vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing, Routing for mobile host , Routing in ad hoc network, Congestion control algorithms principles, Prevention policies , Congestion control in virtual circuit subnets, Congestion control in datagram subnets, Load shedding, virtual circuit, Connectionless internetworking, Tunneling, Internetwork routing and fragmentation, The network layer in the internet: The IP protocol, IP addresses, Internet control protocol, OSPF, BGP | 10 | 20% |
| 5 | Transport Layer<br><br>The transport service: Services provided to the upper layers, Transport service primitives, Socket elements of transport protocols addressing, Connection establishment, Connection release, Flow control, Multiplexing, Crash recovery the transport protocol: UDP, TCP | 10 | 20% |
| 6 | Application Layer<br><br>DNS: The DNS name space, Resource records, Name servers, Electronic mail: Architecture and services, World Wide Web: Architectural overview, HTTP | 5 | 15% |

**Course Outcome:**

| Sr. No. | CO statement | Unit No |
|---|---|---|
| **CO-1** | Understand the basics of computer network, network architecture, TCP/IP and OSI reference models. | 1 |
| **CO-2** | Specify and identify deficiencies in existing protocols of application layers, and then go on to formulate new and better protocols. | 6 |

| | | |
|---|---|---|
| **CO-3** | Describe the Session layer design issues and Transport layer services. | 5 |
| **CO-4** | Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure. | 4 |
| **CO-5** | Understand the functions of data link layer working and internet socket programming and the types of transmission media with real time applications. | 2,3 |

**Teaching & Learning Methodology:-**

Problem - based Learning
Design Thinking
Cooperative Learning
Competency-based Learning

**List of Experiments/Tutorials:**

1. To study different types of topologies and implement in CISCO packet tracer.
2. To demonstrate Networking and Internetworking Devices (NIC, Switch, Hub, Router, Gateway, Repeater, Bridge, cables).
3. To demonstrate different networking commands.
4. To perform crimping in networking & also demonstrates it.
5. Write a program to implement Hamming code.
6. Write a program to implement Bit Stuffing.
7. Write a program to implement CRC.
8. To study Network simulator (NS2) and basic terms (NAM, Trace file, AWK, Xgraph).
9. Case study – Create any Organization Network using GNS3 or Net Sim 11

**Major Equipment:**

1. Computer systems
2. LAN trainer kit

**Books Recommended:-**

Text Books:
1. Computer Network, Andrew S. Tanenbaum, Prentice Hall PTR
Reference Books:
1. Introduction to Data Communication and Networking by Behrouz Forouzan, McGraw Hill
2. Data and Computer Communications, William Stallings, Prentice Hall

**List of Open Source Software/learning website:**

1. Wireshark packet analyzer, Boson network simulator, CISCO Packet tracer
2. Netsim
3. NS2