



**SILVER OAK UNIVERSITY**  
**School of Technology, Design and Computer Application**  
**Silver Oak College of Computer Application**  
**Department of Computer Application**  
**Master of Science Cyber Security & Digital Forensics**  
**Course Name: Data Communication & Computer Networks**  
**Course Code: 1040147104**  
**Semester: 1<sup>st</sup>**

**Prerequisite:** Basics of Computer, Knowledge of Internet.

**Course Objective:** This course is to provide students with an overview of the concepts and fundamentals of data communication and computer networks, routing and switching protocols, data transmission over a network.

**Teaching Scheme:**

Teaching Scheme				
L	T	P	Contact Hours	Credit
3	1	0	4	4

**Content:**

Unit No.	Course Contents	Teaching Hours	% Weightage
1	<b>Introduction to Data Communication:</b> Data Communication, Basics of Data Transmission, Subnetting, Asynchronous and Synchronous Transmission, Error Detection and Correction Codes, Physical Interfaces.	10	23
2	<b>Data Link Control &amp; Principles:</b> Data Link Control, Protocol Principles - Error Control, Flow Control, Bit Oriented and Character Oriented Protocols, Data Link Layer Services.	11	26
3	<b>Packet Switching and Wide Area Networks:</b> Introduction to Routing and Traffic Control Local and, Metropolitan Area Networks, LAN/MAN Technology Topologies, Introduction to Internet and TCP/IP.	11	26
4	<b>Network Configuration &amp; Troubleshooting :</b> Basics of IP addressing, subnetting, DHCP, Configuration of routers & switches, Troubleshooting common connectivity issues using diagnostic tools, Implementing device security measures such as access control and port security, Introduction to wireless encryption and firewall configuration, Practical exercises including scenario-	6	15

	based troubleshooting and network traffic analysis.		
5	<b>Networking and Security:</b> Network architecture, specialized protocols- Modbus and EtherNet/IP, network reliability techniques, security measures-access control and intrusion detection, secure remote access methods, protocol conversion and diagnostic tools.	4	10

**Course Outcomes:**

Sr. No.	CO-Statement	Unit No
CO-1	Identify the fundamental principles of data communication, including basic concepts of data transmission, subnetting, and physical interfaces.	1
CO-2	Evaluate the effectiveness of various error control and flow control mechanisms in data link protocols.	2
CO-3	Implement routing algorithms and configure routers to enable data routing within local and wide area networks.	3
CO-4	Apply diagnostic tools and configuration commands.	4
CO-5	Apply different strategies for designing and maintaining resilient and secure systems.	5

**Teaching & Learning Methodology: -**

1. The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
2. Projector and Computer
3. Experiments shall be performed in the laboratory related to course contents

**List of Tutorials:**

**Total Hours: 14**

Sr. No.	Tutorials Name
1.	Introduction to Packet Tracer: StaticRouting
2.	Packet Tracer: Configuration of staticRouting
3.	Configure Static Routing on Three Routers
4.	Configure RIP on routers using PacketTracer
5.	Configure OSPF on routers using PacketTracer
6.	Configuration of NAT using PacketTracer
7.	Configuration of VLAN on Switches using PacketTracer
8.	Case Study on Wireshark
9.	Configuring and Securing IP Addressing, Subnetting, Routers, and Switches

10.	Analyzing and Troubleshooting Network Connectivity and Traffic
11	Troubleshooting and securing networks

**Major Equipment:**

1. Computer System
2. LAN cable

**Books Recommended:**

1. Brijendra Singh “Data Communications Computer Networks” Prentice-Hall Of India Pvt. Limited
2. William Stallings “Data and Computer Communications” Pearson

**CO-PO-PSO MATRIX:**

Co.No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO-1	1	2	1	1				3	3
CO-2	2	3	1			2		2	3
CO-3	1	2	1	2				2	2
CO-4	1	1		2		2		2	1
CO-5	1	2	1	2		1		2	2