

Gujarat University
K. S. School of Business Management and Information Technology
[Five Years' (Full – Time) M.Sc. (CA&IT) Integrated Degree Course]
Second Year M.Sc. (CA&IT) (Semester - III)

Course Name: Computer Network Analysis & Management

Course Code: SEC-NAM-236

Course Credit: 2

Objective:

The primary objective of this course is to provide students with comprehensive knowledge and hands-on experience in network analysis and management. Students will learn to effectively use network analysis tools, configure and manage network services, and develop the skills required to troubleshoot and optimize network performance. The course aims to bridge the gap between theoretical concepts and practical applications, preparing students to handle real-world network management challenges efficiently.

Course Outcomes:

By the end of this course, students will be able to:

- Solid understanding of computer network concepts, protocols, and architectures.
- Install, configure, and manage essential network services, including file servers, print servers, mail servers, proxy servers, and web servers.
- Install and test network devices such as routers, repeaters, and bridges, and set up small wireless networks.
- Proficiently use various network analysis tools (e.g., Wireshark, Tcpdump) to capture, analyze, and interpret network traffic.
- Perform detailed analysis of common network protocols, including Ethernet, IP, TCP, UDP, HTTP, DNS, and DHCP.

Contents:

Unit No.	Course Content	Hours	Credits
1	Install and configure various network services and devices. Develop a small Network. Install Windows 2003/Windows 2008 Network Operating System. Install and configure a File Server. Install and configure a Print Server. Install and configure a Mail Server. Install and configure a Proxy Server. Install & Test Router, Repeater and Bridge. Install a small wireless network using access points. Set, Configure & Test Internet	30	1

2	Network Analysis & Monitor Install the packet analyzer tool on your system. Familiarize yourself with the user interface. Capture live network traffic on different interfaces (Ethernet, Wi-Fi). Capture network traffic Identify and inspect different types of packets. Understand the structure of Ethernet, IP, and TCP/UDP packets Capture network traffic involving HTTP, DNS, and DHCP protocols. Analyze the captured traffic and understand the protocol interactions.	30	1
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Reference Books:

1. Practical Packet Analysis: Using Wireshark to Solve Real-World Network Problems" by Chris Sanders
2. Computer Networks and Internets" by Douglas E. Comer
3. "Network Security Essentials: Applications and Standards" by William Stallings
4. "Computer Networking: Principles, Protocols and Practice" by Olivier Bonaventure

Accomplishments of the student after completing the Course:-

Upon completing the course, students will be able to:

- Install and test networking devices such as routers, repeaters, and bridges.
- Set up and manage small wireless networks, ensuring secure and efficient connectivity.
- Install and configure essential network services including file servers, print servers, mail servers, proxy servers, and web servers.
- Manage and maintain these services for optimal performance and security.
- Perform in-depth analysis of various network protocols including Ethernet, IP, TCP, UDP, HTTP, DNS, and DHCP.
- Efficiently use network analysis tools such as Wireshark and Tcpdump to capture and interpret network traffic.
- Customize and automate network capture and analysis using command-line tools.
- Understand and identify key fields and functions within protocol headers and payloads.
- Apply complex display filters to isolate specific network traffic.
- Utilize search tools to locate specific packets within captured data.