INTRODUCTION TO COMPUTER NETWORKING

(PRE-CCNA COURSE)

Course Description:
This foundational course introduces students to the fundamental concepts of computer networking, preparing them for more advanced certifications like CCNA. Students will learn how networks operate, discover what various network components do, and understand how they communicate. The course combines theoretical knowledge with practical, hands-on activities using network simulation tools.

Learning Outcomes:
Upon successful completion of this course, students will be able to:

1. Explain network fundamentals and key protocols
2. Identify network components and their functions
3. Understand TCP/IP and OSI models
4. Configure basic network devices
5. Implement IPv4 and IPv6 addressing schemes
6. Troubleshoot common network issues
7. Describe network security fundamentals
8. Prepare for advanced networking courses and CCNA studies

Week 1-2: Network Fundamentals

- What is a network? Types of networks (LAN, WAN, MAN)
- Network topologies and architectures
- Network components: routers, switches, access points, firewalls
- Lab 1: Network simulation software introduction

Week 3-4: Network Models and Protocols

- OSI Model (7 layers) and TCP/IP Model (4 layers)
- Protocol suites and standards organizations
- Data encapsulation and de-encapsulation

- Lab 2: Protocol analysis with Wireshark basics

Week 5-6: Physical Layer and Cabling

- Network media types: copper, fiber, wireless
- Ethernet fundamentals
- Basic network cabling (straight-through, crossover)
- Lab 3: Cable creation and testing (simulated)

Week 7-8: Data Link Layer and Switching

- MAC addressing and frame structure
- Ethernet switching fundamentals
- VLANs introduction
- Lab 4: Basic switch configuration

Week 9-10: Network Layer and IP Addressing

- IPv4 addressing and subnetting basics
- IPv6 fundamentals
- Router operation basics
- Lab 5: IPv4 addressing and subnetting exercises

Week 11: Midterm Exam

Week 12-13: Transport Layer and Application Layer

- TCP vs. UDP
- Port numbers and common applications
- DHCP, DNS, HTTP/HTTPS basics
- Lab 6: Service configuration and testing

Week 14-15: Network Security and Management

- Security threats and mitigation basics
- Access control fundamentals
- Network troubleshooting methodology
- Lab 7: Basic security configurations

Week 16: Final Review and Course Wrap-up

- Comprehensive review
- CCNA path guidance and career opportunities