COURSE INFORMATION FORM

DISCIPLINE  CSIS
COURSE TITLE  Introduction to Networks CCNA 1
CR.HR  4  LECT HR.  3  LAB HR.  2
CATALOG DESCRIPTION
This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. Labs use a “model Internet” to allow students to analyze real data without affecting production networks. Packet Tracer (PT) activities help students analyze protocol and network operation and build small networks in a simulated environment. At the end of the course, students build simple LAN topologies by applying basic principles of cabling, performing basic configurations of network devices such as routers and switches, and implementing IP addressing schemes.

PREREQUISITES
CSIS 110

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)

Upon completion of this course, the student will be able to:

1. Explain the importance of data networks and the Internet in supporting business communications and everyday activities.
2. Explain how communication works in data networks and the Internet.
3. Recognize and describe the devices and services used to support communications in data networks and the Internet.
4. Use network protocol models to explain the layers of communication in data networks.
5. Explain the role of protocols in data networks.
6. Describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environment.
7. Describe the operation of protocols at the OSI data link layer and explain how they support communications.
8. Explain the role of the physical layer protocols and services in supporting communications across data networks.
9. Describe the protocols and services provided by the application layer in the OSI and TCP/IP models and describe how this layer operates in various networks.
10. Design, calculate and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks.
11. Employ basic cabling and network designs to connect devices.
12. Explain fundamental Ethernet concepts such as media, services and operations.
13. Analyze the operations and features of transport layer protocols and services.
14. Analyze the operations and features of network layer protocols and services and explain the fundamental concepts of routing.
15. Build a simple Ethernet network using routers and switches.
16. Use Cisco command-line interface (CLI) commands to perform basic router and switch configurations and verification.
17. Analyze the operations and features of common application layer protocols such as HTTP, Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), Simple Mail Transfer Protocol (SMTP), Telnet and File Transfer Protocol (FTP).

18. Utilize common network utilities to verify small network operations and analyze data traffic.

GENERAL EDUCATION OUTCOMES (ESO)
Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>ESO</th>
</tr>
</thead>
</table>

PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

The student will demonstrate:

1. the ability to use industry specific software and/or apply troubleshooting skills to solve problems. (13-18)
2. the ability to work effectively in a team environment. (1-18)

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

Classroom Discussion/Participation (1-18)
Assignments/Labs (1-18)
Written Exam (1-18)
Skills Exam (1-18)
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Globally Connected
   A. Networks Support the Way We Learn, Work, Play and Communicate
   B. Providing Resources in a Network, Components of a Network, LANs, WANs and the Internet
   C. The Network as a Platform, Convergence and Reliability
   D. The Changing Network Environment, Trends, Technology and Security
   E. Network Architectures

II. Configuring an Operating System
    A. Accessing the operating system, using commands and navigating the operating system
    B. Naming devices and limiting access to device configurations
    C. Addressing Schemes, configuring IP addresses on devices & verifying connectivity

III. Network Protocols and Communications
     A. Rules of Communication
     B. Network Protocols and Standards
     C. Moving Data in the Network

IV. Network Access
    A. Physical Layer Protocols
    B. Network Media, wired and wireless
    C. Data Link Layer Protocols
    D. Media Access Control and Topologies for LANs and WANs

V. Ethernet
   A. Ethernet Protocol Operation and Frame Attributes
   B. Address Resolution Protocol Functions, Operation and Role in Remote Communication
   C. Switching Layers 2 and 3, Port Fundamentals and Frame Forwarding

VI. OSI Network Layer
    A. IPv4 and IPv6 Protocol Characteristics and Header Fields
    B. Routing and Forwarding Decisions
    C. Anatomy of a Router
    D. Configuring a Router and a Host Default Gateway for Communication

VII. OSI Transport Layer
     A. Roles of the Transport Layer
     B. Transportation of Data with TCP and UDP Protocols
C. TCP Protocol - Communicating with reliability and flow control
D. UDP Protocol – Communicating with Low Overhead

VIII. IP Addressing
A. IPv4 Network Addresses, Host Addresses and Subnet Masks
B. Binary Numbering system, Converting Decimal to Binary, ANDing Operations and Calculating IPv4 Addresses
C. IPv6 Network Addresses, Interface Addresses and Prefixes
D. Hexadecimal Numbering System, Address Representation and Calculating IPv6 Addresses
E. Types of IPv4 and IPv6 Addresses
F. Connectivity Testing and Verification

IX. Subnetting IP Networks
A. Network Segmentation, Calculating Subnets, Calculating Number of Hosts and Determining Valid Host Addresses and Communication Between Subnets
B. Planning to Address the Network and Assigning Addresses to Devices
C. Subnetting an IPv6 Network, IPv6 Subnet Allocation and Assigning Interface Addresses

X. Application Layer Functionality and Protocols
A. Application, Presentation and Session Layers of OSI Model
B. Well-Known Application Layer Protocols and Services
C. Providing IPv4 and IPv6 Addressing Services and File Sharing Services
D. Getting Data through the Internet to the End Device to the Right Application

XI. It’s a Network
A. Design Considerations for Devices and Protocols in a Small Network While Allowing for Scalability
B. Network Device Security Threats and Measures to Mitigate Attacks and Secure Devices
C. Basic Network Performance
D. Managing Operating System and Configuration Files, Backing Up and Restoring
E. Types of Integrated Routers, Wireless Capability, Configuring and Enabling Wireless