COURSE INFORMATION FORM

DISCIPLINE   CSIS
COURSE TITLE Connecting Networks CCNA 4

CR.HR.  4  LECT HR.  3  LAB HR.  2  CLIN/INTERN HR.  _______  CLOCK HR.  _______

CATALOG DESCRIPTION
This course discusses the WAN technologies and network services required by converged applications in a complex network. The course enables students to understand the selection criteria of network devices and WAN technologies to meet network requirements. Students learn how to configure and troubleshoot network devices and resolve common issues with data link protocols. Students will also develop the knowledge and skills needed to implement virtual private network (VPN) operations in a complex network.

PREREQUISITES
CSIS 212

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)

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

1. Identify specific hierarchical design characteristics by access, distribution, or core layers.
2. Compare four different network descriptions and topologies to identify the appropriate WAN technology types.
3. Classify WAN access options by types and sub-types.
4. Identify serial communications terminology by descriptions.
5. Identify Frame Relay terminology and concepts by specified characteristics.
6. Describe the importance, benefits, role, impact and components of VPN technology.
7. Explain the basic operation of Network Address Translation (NAT).
8. Identify cable, DSL and broadband wireless terminology by definitions.
9. Diagnose and repair the physical layer, data link layer and network layer.
10. Configure PPP encapsulation on a serial interface with an IPv4 and IPv6 address, compression, and link quality monitoring enabled.
11. Configure PPP authentication.
12. Use show and debug commands to troubleshoot PPP.
13. Configure static Frame Relay maps and LMI types.
15. Configure dynamic and static NAT.
16. Configure port address translation (PAT).
17. Troubleshoot NAT issues.
18. Configure point-to-point GRE VPN tunnel.
19. Configure syslog and ntp.
20. Collect and analyze NetFlow data.
21. Isolate and resolve enterprise network issues.
**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>
<tbody>
<tr>
<td>Quantitative Literacy and Mathematical Analysis</td>
<td></td>
</tr>
</tbody>
</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. (9-21)
2. the ability to work effectively in a team environment. (1-21)

**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 (1-21)
- Assignments/Labs (1-21)
- Written Exam (1-21)
- Skills Exam (1-21)
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. Hierarchical Network Design
   A. Enterprise Network Campus Design
   B. Modular Network Design, Cisco Enterprise Architecture Model
   C. Emerging Network Architectures

II. WAN Technologies
    A. Purpose of WANs and WAN Operations
    B. Selecting a WAN Technology, Private and Public Infrastructures

III. Point-to-Point Connections
     A. Serial point-to-point overview, HDLC encapsulation
     B. PPP operation, LCP and NCP, PPP sessions
     C. Configuring PPP and authentication
     D. Troubleshooting WAN Connectivity

IV. Frame Relay
    A. Introduction to Frame Relay, benefits, operation and advanced concepts
    B. Configuring Frame Relay and subinterfaces
    C. Verify and troubleshoot Frame Relay operation

V. Network Address Translation (NAT) for IPv4
   A. NAT Operation and Benefits
   B. Configuring static and dynamic NAT and Port Address Translation (PAT)
   C. Troubleshooting NAT

VI. Broadband Solutions
    A. Teleworking
    B. Comparing Broadband Solutions
    C. Configuring xDSL Connectivity

VII. Securing Site-to-Site Connectivity
     A. VPNs
     B. Implementing GRE Tunnels
     C. Internet Protocol Security (IPsec) and IPsec Framework
     D. Remote Access VPN solutions

VIII. Monitoring the Network
      A. Syslog Operation and Configuration
B. SNMP Operation and Configuration
C. NetFlow Operation, Configuring and Examination of Traffic Patterns

IX. Troubleshooting the Network with a Systematic Approach
   A. Network Documentation and Troubleshooting Process
   B. Troubleshooting Tools
   C. Symptoms and Causes of Network Troubleshooting
   D. Troubleshooting IP Connectivity