SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: CISCO CCNA Certification IV

CODE NO. : CSN310 **SEMESTER:** 6

PROGRAM: COMPUTER NETWORK TECHNOLOGY

AUTHOR: TYCHO BLACK

DATE: JAN. 2004 **PREVIOUS OUTLINE DATED:** JAN. 2003

APPROVED:

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DEAN **DATE**

TOTAL CREDITS: 4

PREREQUISITE(S): CSN309

HOURS/WEEK: 4

I. COURSE DESCRIPTION:

This course completes the preparation for certification in the Cisco Certified Networking Associate (CCNA) program. The main focus of the Cisco CCNA 4 course is “WAN Technologies”, including NAT, PAT, PPP, ISDN, Frame Relay and Network Management. In addition, a significant part of CCNA 4 is the a Case Study in which the student designs a large network from the basic LAN cabling up to selection of the WAN services. Preparation for the CCNA certification examination, which includes content from all four CCNA courses, will be included as a final review activity.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. **Specify new network media technologies appropriately, including wireless, optical and Ethernet.**

   Potential Elements of the Performance:

   - Describe the primary types of optical and wireless media, including their operating principles, advantages and uses in networking.
   - Describe modulation techniques and spread-spectrum technology.
   - Identify various standards associated with Ethernet, optical and wireless media.
   - Understand the specifications, frame formats, transmission processes, specific media, and encoding used in each Ethernet technology.
   - Understand the architectural considerations of each Ethernet technology.

   Reference: Module 3, 4, 6 and 7 (CCNA1 Bridge course)

   Note: This component of the course upgrades earlier CCNA1 curriculum to CCNA1 v3.0.

2. **Recommend and implement solutions to problems relating to IP address scaling.**

Potential Elements of the Performance:

- Explain why scaling IP addresses is necessary.
- Configure and troubleshoot NAT, Network Address Translation, and PAT, Port Address Translation implementations.
- Configure and troubleshoot DHCP, Dynamic Host Configuration Protocol implementations.

Reference: Module 1 (CCNA4 online curriculum)

3 **Specify Wide Area Network technologies to meet a particular design requirement.**

Potential Elements of the Performance:

- Identify the devices used in a WAN.
- Identify WAN standards.
- Describe WAN encapsulation and classify various WAN link options.
- Differentiate between packet-switched and circuit-switched WAN technologies.
- Describe the steps in WAN design,

Reference: Module 2 (CCNA4 online curriculum)

4. **Configure the Point-to-Point Protocol**

Potential Elements of the Performance:

- Explain serial communications.
- Describe and give an example of TDM
- Discuss, configure and troubleshoot HDLC interfaces.
- Identify the advantages of using PPP.
- Explain the functions of the Link Control Protocol (LCP) and the Network Control Protocol (NCP) components of PPP
- Describe the parts of a PPP frame, and identify the three phases of a PPP session.
- Explain the difference between PAP and CHAP
- List the steps in the PPP authentication process.
- Identify the various PPP configuration options.
- Configure PPP encapsulation.
- Configure CHAP and PAP authentication.

- Troubleshoot any problems with PPP configuration.

Reference: Module 3 (CCNA4 online curriculum)

5. **Configure ISDN and DDR on routers**

Potential Elements of the Performance:

- Define the ISDN standards used for addressing, concepts, and signaling.
- Describe how ISDN uses the physical and data link layers.
- List the interfaces and reference points for ISDN.
- Configure the router ISDN interface.
- Determine what traffic is allowed when configuring DDR.
- Configure static routes for DDR.
- Choose the correct encapsulation type for DDR.
- Be able to determine and apply an access list affecting DDR traffic.
- Configure dialer interfaces.

Reference: Module 4 (CCNA4 online curriculum)

6. **Configure Frame Relay on routers.**

Potential Elements of the Performance:

- Identify the components of a Frame Relay network.
- Explain the scope and purpose of Frame Relay.
- Discuss the technology of Frame Relay.
- Compare point-to-point and point-to-multipoint topologies.
- Examine the topology of a Frame Relay network.
- Configure a Frame Relay Permanent Virtual Circuit (PVC).
- Create a Frame Relay Map on a remote network.
- Explain the issues of a non-broadcast multi-access network.
- Describe the need for subinterfaces and how to configure them.
- Verify and troubleshoot a Frame Relay connection.

Reference: Module 5 (CCNA4 online curriculum)

7. **Perform Network Monitoring and Administration Activities**

Potential Elements of the Performance:

- Identify network management tools.
- Identify the driving forces behind network management .

- Describe the OSI and network management model.
- Describe SNMP and CMIP.
- Describe how management software gathers information and records problems.
- Utilize a MIB Browser or other network monitoring tools to gather and analyze information about a network.

Reference: Module 6 (CCNA4 online curriculum)

7. **Prepare and present a Case Study of a LAN/WAN Design.**

Potential Elements of the Performance:

- Design and present a complete LAN/WAN implementation based on required specifications.

III. TOPICS:

1. IP Address Scaling.
2. WAN Technologies
3. PPP
4. ISDN and DDR
5. Frame Relay
6. Network Management
7. Case Study

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

All required course materials are available on-line.

Text (optional)*: "Cisco Networking Academy Program CCNA 3 and 4 Companion Guide, Third Edition, Cisco Press 2003, ISBN 1-58713-113-7*

V. EVALUATION PROCESS/GRADING SYSTEM:

Online Cisco Module tests and block tests:	40%
Final Cisco Exam	20%
Practical Tests	20%
Lab Activities	20%

(The percentages shown above may vary slightly if circumstances warrant.)

The following semester grades will be assigned to students in postsecondary courses:

Grade	Definition	*Grade Point Equivalent*
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00

CR (Credit)	Credit for diploma requirements has been awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

VI. SPECIAL NOTES:

Special Needs:
If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 493 so that support services can be arranged for you.

Retention of Course Outlines:
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:
Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:
The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

Upgrading Of Incompletes

When a student's course work is incomplete or final grade is below 50%, there is the possibility of upgrading to a pass when a student meets all of the following criteria:

1. The student’s attendance has been satisfactory.
2. An overall average of at least 40% has been achieved.
3. The student has not had a failing grade in all of the theory tests taken.
4. The student has made reasonable efforts to participate in class and complete labs.

The nature of the upgrading requirements will be determined by the instructor and may involve one or more of the following: completion of existing labs and assignments, or re-taking individual tests.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.