SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: Cisco (CCNA) Certification IV

CODE NO. : CSN310 **SEMESTER:** 4

PROGRAM: Computer Network Technician

AUTHOR: Mark Allemang

DATE: Jan. 2010 **PREVIOUS OUTLINE DATED:** Feb: 2008

APPROVED: "B. Punch"

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Chair **DATE**

TOTAL CREDITS: 5

PREREQUISITE(S): CSN309

HOURS/WEEK: 6 (for 10 weeks)

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 PPP, Frame Relay, Security, Teleworker technologies, IP Addressing services and Troubleshooting.   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.   **Describe the fundamental concepts of point-to-point serial communications.**

Potential Elements of the Performance:

- Describe key PPP concepts.
- Configure PPP encapsulation.
- Explain and configure PAP and CHAP authentication.

   This learning outcome will constitute approximately 15% of the course.

Reference: Module 2 (CCNA4 online curriculum)

2.   **Describe the fundamental concepts of Frame Relay technology in terms of enterprise WAN services, including operation, implementation requirements, maps, and Local Management Interface (LMI) operation.**
Potential Elements of the Performance:

- Configure a basic Frame Relay permanent virtual circuit (PVC), including configuring and troubleshooting Frame Relay on a router serial interface and configuring a static Frame Relay map.

- Describe advanced concepts of Frame Relay technology in terms of enterprise WAN services, including subinterfaces, bandwidth, and flow control.
- Configure an advanced Frame Relay PVC, including solving reachability issues, configuring subinterfaces, and verifying and troubleshooting a Frame Relay configuration.

  This learning outcome will constitute approximately 15% of the course.

  Reference: Module 3 (CCNA4 online curriculum)

3. **Secure a network.**

   Potential Elements of the Performance:

- Identify security threats to enterprise networks
- Describe methods to mitigate security threats to enterprise networks
- Configure basic router security
- Disable unused router services and interfaces
- Use the Cisco SDM one-step lockdown feature
- Manage files and software images with the Cisco IOS Integrated File System (IFS)
- Explain how ACLs are used to secure a medium-size enterprise branch office network, including the concept of packet filtering, the purpose of ACLs, how ACLs are used to control access, and the types of Cisco ACLs.
- Configure standard ACLs in a medium-size enterprise branch office network, including defining filtering criteria, configuring standard ACLs to filter traffic, and applying standard ACLs to router interfaces.
- Configure extended ACLs in a medium-size enterprise branch office network, including configuring extended ACLs and named ACLs, configuring filters, verifying and monitoring ACLs, and troubleshooting extended ACL issues.
- Describe complex ACLs in a medium-size enterprise branch office network, including configuring dynamic, reflexive, and timed ACLs, verifying and troubleshooting complex ACLs, and explaining relevant caveats.

  This learning outcome will constitute approximately 25% of the course.

  Reference: Module 4 & 5 (CCNA4 online curriculum)

4. **Describe the enterprise requirements for providing teleworker services, including the differences between private and public network infrastructures.**
    Potential Elements of the Performance:

    - Describe the teleworker requirements and recommended architecture for providing teleworking services.
    - Explain how broadband services extend enterprise networks using DSL, cable, and wireless technology.
    - Describe the importance of VPN technology, including its role and benefits for enterprises and teleworkers.
    - Describe how VPN technology can be used to provide secure teleworker services to an enterprise network.

    This learning outcome will constitute approximately 15% of the course.

    Reference: Module 6 (CCNA4 online curriculum)

5. **Implement DHCP, NAT and IPV6 on a routed network.**

    Potential Elements of the Performance:

    - Configure DHCP in an Enterprise branch network. This includes being able to explain DHCP features and benefits, the differences between BOOTP and DHCP, DHCP operation: and configuring, verifying, and troubleshooting DHCP.
    - Configure NAT on a Cisco router. This includes explaining key features and operation of NAT and NAT Overload, explaining advantages and disadvantages of NAT, configuring NAT and NAT Overload to conserve IP address space in a network, configuring port forwarding, and verifying and troubleshooting NAT configurations.
    - Configure new generation RIP (RIPng) to use IPv6. This includes explaining how IPv6 solves any problem of IP address deletion, explaining how to assign IPv6 addresses, describing transition strategies for implementing IPv6 and configuring, verifying and troubleshooting RIPng for IPv6.

    This learning outcome will constitute approximately 15% of the course.

    Reference: Module 7 (CCNA4 online curriculum)

6. **Identify and troubleshoot common enterprise network implementation issues using a layered model approach.**
    Potential Elements of the Performance:

    - Establish and document a network baseline.
    - Describe the various troubleshooting methodologies and troubleshooting tools.
    - Describe the common issues that occur during WAN implementation.
    - Identify and troubleshoot common enterprise network implementation issues using a layered model approach.

    This learning outcome will constitute approximately 15% of the course.

    Reference: Module 8 (CCNA4 online curriculum)

III.   TOPICS:

1. PPP
2. Frame Relay
3. Security
4. Teleworker
5. IP Addressing Services
6. Troubleshooting

IV.   REQUIRED RESOURCES/TEXTS/MATERIALS:

All required course materials are available on-line.

Text (optional but recommended "Accessing the WAN, CCNA Exploration Companion Guide" by Cisco Press , 2008. ISBN: 1-58713-205-2

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V. EVALUATION PROCESS/GRADING SYSTEM:

Online Cisco Module tests and block tests:	30%
Final Cisco CCNA 4 Exam	25%
Practical Test	15%
Lab Activities and	30%

(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:

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.

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.

Prior Learning Assessment:
Students who wish to apply for advance credit transfer (advanced standing)
should obtain an Application for Advance Credit from the program coordinator (or
the course coordinator regarding a general education transfer request) or
academic assistant. Students will be required to provide an unofficial transcript
and course outline related to the course in question. Please refer to the Student
Academic Calendar of Events for the deadline date by which application must be made
for advance standing.

Credit for prior learning will also be given upon successful completion of a
challenge exam or portfolio.

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

Disability Services:
If you are a student with a disability (e.g. physical limitations, visual impairments,
hearing impairments, or learning disabilities), you are encouraged to discuss
required accommodations with your professor and/or the Disability Services
office. Visit Room E1101 or call Extension 2703 so that support services can be
arranged for you.

Communication:
The College considers **WebCT/LMS** as the primary channel of communication
for each course. Regularly checking this software platform is critical as it will
keep you directly connected with faculty and current course information.
Success in this course may be directly related to your willingness to take
advantage of the **Learning Management System** communication tool.

Plagiarism:
Students should refer to the definition of "academic dishonesty" in *Student Code
of Conduct*. A professor/instructor may assign a sanction as defined below, or
make recommendations to the Academic Chair for disposition of the matter. The
professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of
a lower grade with explanation, (iii) require additional academic assignments and
issue a lower grade upon completion to the maximum grade "C", (iv) make an
automatic assignment of a failing grade, (v) recommend to the Chair dismissal
from the course with the assignment of a failing grade. 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.

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Student Portal:
The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to https://my.saultcollege.ca.

Electronic Devices in the Classroom:
Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:
Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

Tuition Default:
Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of *March,* will be removed from placement and clinical activities. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.