



**COURSE DESCRIPTION:****I.**

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)**

**CCNA Portable Command Guide, 2nd Edition**

ISBN-10: 1-58720-193-3

**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:

<b>Grade</b>	<b><u>Definition</u></b>	<b><i>Grade Point Equivalent</i></b>
A+	90 – 100%	4.00
A	80 – 89%	3.00
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:****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.

**VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located on the portal form part of this course outline.