

I. COURSE DESCRIPTION:

This course builds on the CCNA curriculum by covering advanced routing concepts and protocols. Instruction includes advanced concepts in networking, network terminology, and routing protocols, including the Border Gateway Protocol (BGP), the Enhanced Interior Gateway Routing Protocol (EIGRP), the multi-area Open Shortest Path First (OSPF) protocol, Multicasting and the Intermediate System-to-Intermediate System (IS-IS) protocol. Topics also include IP Internet Protocol Version 6, hierarchical design principles for building scalable internetworks, advanced routing concepts in building scalable internetworks, and key characteristics for building a secure, responsive, and adaptable internetwork using access control lists (ACLs), route redistribution, and policy-based routing.. Students will install, configure, and operate complex routed LAN and WAN networks.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Build Scalable IP Internetworks

Potential Elements of the Performance:

- List and describe the layers of the 3 layer hierarchical design model.
- List and describe the characteristics of scalable internetworks
- Select appropriate routing protocols
- Implement advanced routing techniques such as priority queuing, equal & unequal cost load balancing.

This learning outcome will constitute approximately 20% of the course.

Reference: Module 1

2. Utilize Interior routing protocols at an advanced level.

Potential Elements of the Performance:

- Describe various routing processes including default routing, floating static routes, convergence and route calculations.
- Describe EIGRP characteristics such as packet types, various EIGRP tables and route summarization with EIGRP
- Describe the characteristics of multiple area OSPF networks.
- Describe the characteristics of OSPF network types including stub, totally stubby and not so stubby (NSSA) areas.

- Compare IS-IS with other Link State routing protocols.
- Develop a vocabulary for the IS-IS routing protocol and be able to describe terms such as End devices and Intermediate (IS) devices.
- Configure IS-IS routed networks

This learning outcome will constitute approximately 35% of the course.

Reference: Module 2-5

3. Improve network performance through advanced control of interior routing protocols

Potential Elements of the Performance:

- Control routing update traffic
- Implement policy routing
- Control route redistribution
- Complete a routing optimisation challenge lab

This learning outcome will constitute approximately 10% of the course.

Reference: Module 8

4. Describe the characteristics of and configure the BGP Border Gateway Routing Protocol

Potential Elements of the Performance:

- Describe the characteristics of autonomous systems from a Border Gateway Routing Protocol perspective
- Compare and contrast multihomed non transit and multihomed transit autonomous systems.
- Describe and configure the various attributes of BGP for example: next hop, AS_PATH, Multi Exit Discriminator (MED) attribute
- Configure Redundancy symmetry and load balancing in BGP networks
- Complete a BGP challenge lab in preparation for the course practical test

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

Reference: Module 6

5. Describe Multicasting at the Layer 3 and Layer 2 level and implement multicast networks.

Potential Elements of the Performance:

- Describe multicasting in general
- Utilize IGMP and describe layer 2 multicasting issues
- Describe and select the appropriate Layer 3 Multicasting routing protocol.
- Configure and verify a multicast network.

This learning outcome will constitute approximately 10% of the course.

Reference: Module 7

6. Describe IP Version 6 and implement it in a routed OSPF environment.

Potential Elements of the Performance:

- Explain the addressing format for IPv6
- Compare and contrast ipv6 unicast, multicast and anycast
- Describe and implement IPv6 routing
- Describe the IPv6 transition mechanisms
- Implement IPv6 tunneling through IPv4 networks

This learning outcome will constitute approximately 10% of the course.

Reference: Module 8

III. TOPICS:

1. Scalable Internetworks
2. Routing with IGPs
3. Route optimisation
4. Exterior Gateway Protocols
5. Multicasting
6. IPv6

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

None. All curriculum is online.

V. EVALUATION PROCESS/GRADING SYSTEM:

Theory:

Online Cisco Module exams	30%
Online Final Cisco Exam	25%

Lab:

Practical Test	20%
Lab Activities	25%

Special Note:

Online Cisco exams must be written in class during class time. It is unacceptable to print or otherwise copy any of the online Cisco exams.

The following semester grades will be assigned to students:

Grade	Definition	<i>Grade Point Equivalent</i>
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: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.