

## Master Syllabus

### CIS 2416 - Routing & Switching Essentials

**Division:** Business and Public Services

**Department:** Computer Information Systems

**Credit Hour Total:** 4.0

**Lecture Hrs:** 4.0

**Prerequisite(s):** CIS 1411

**Other Prerequisite(s):** AND Other must be completed within the last two years

**Date Revised:** December 2015

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### Course Description:

This course focuses on learning the architecture, components and operations of routers and switches in a small network. Students will learn how to configure a router and a switch for basic functionality. Commonly used network services and protocols will be studied.

### General Education Outcomes:

- Critical Thinking/Problem Solving Competency
- Computer Literacy Competency

### Course Outcomes:

#### Switching Operations

This course begins an examination of the flow of traffic in a modern network. It examines some of the current network design models and the way LAN switches build forwarding tables and use the MAC address information to efficiently switch data between hosts.

**Assessment Method:** Simulations

**Performance Criteria:**

A score of 80% or higher on assignments

**Assessment Method:** Standardized national examinations

**Performance Criteria:**

A score of 80% or higher on exam

#### VLAN Operation, Configuration, and Troubleshooting

Configure and verify Virtual Local Area Networks (VLANs), VLAN security and trunking on switches. Describe enhanced switching technologies such as interVLAN routing, EAPs, ERPs, LAGs, MLAGs, virtual switch bonding, HAU, and loop recovery protocols.

**Assessment Method:** Simulations

**Performance Criteria:**

A score of 80% or higher on assignments

**Assessment Method:** Standardized national examinations

**Performance Criteria:**

A score of 80% or higher on exam

#### Initial switch configuration

Perform basic switch configuration tasks (security and management), including remote access management. Select the appropriate media, cables, ports, and connectors to connect switches to other network devices. Interpret show and debug commands to verify the operational status of a switched network. Identify and correct common network problems using a layered model approach.

**Assessment Method:** Simulations

**Performance Criteria:**

A score of 80% or higher on assignments

**Assessment Method:** Standardized national examinations

**Performance Criteria:**

A score of 80% or higher on exam

#### Distance-vector routing protocols

Configure, troubleshoot, and verify basic Routing Information Protocol (RIP and RIPng) in a small to medium routed network. Use router show and debug commands to troubleshoot common errors that occur on small to medium routed networks. Introduce the use of policy based routing, multicast routing and VRRP to the routing process.

**Assessment Method:** Simulations

**Performance Criteria:**

A score of 80% or higher on assignments

**Assessment Method:** Standardized national examinations

**Performance Criteria:**

A score of 80% or higher on exam

### **Understand router entries & router lookup process**

Describe how a router determines path information and switches packets. Use the command line interface (CLI) to investigate routing tables and troubleshoot network problems. Configure classful and classless routing. Configure and verify static, summary, and floating routes in the routing table.

**Assessment Method:** Simulations  
**Performance Criteria:**

A score of 80% of higher on assignments

**Assessment Method:** Standardized national examinations  
**Performance Criteria:**

A score of 80% of higher on exam

### **Understand link-state routing protocols**

Describe advantages and disadvantages of link-state versus distance-vector routing protocols. Configure and verify operations in a single area or multi area Open Shortest Path First (OSPFv2 and OSPFv3) environment. Troubleshoot problems that arise in OSPF implementations.

**Assessment Method:** Simulations  
**Performance Criteria:**

A score of 80% of higher on assignments

**Assessment Method:** Standardized national examinations  
**Performance Criteria:**

A score of 80% of higher on exam

### **Understand access control lists**

Describe the guidelines for the use of ACLs in a routed network. Configure, verify and troubleshoot the application of an ACL in a network per networking requirements.

**Assessment Method:** Simulations  
**Performance Criteria:**

A score of 80% of higher on assignments

**Assessment Method:** Standardized national examinations  
**Performance Criteria:**

A score of 80% of higher on exam

### **Understand DHCP and NAT operations**

Describe and explain the functionality, configuration and troubleshooting of both DHCPv4 and DHCPv6 and NAT.

**Assessment Method:** Simulations  
**Performance Criteria:**

A score of 80% of higher on assignments

**Assessment Method:** Standardized national examinations  
**Performance Criteria:**

A score of 80% of higher on exam

### **Outline:**

- Switching operations
- Initial switch configuration
- VLAN operation, configuration, and troubleshooting
- Distance-vector routing protocols
- The router lookup process and routing table entries
- Features and concepts of link-state routing protocols
- Features and concepts of access control lists
- DHCP and NAT operation, configuration, and troubleshooting