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

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% of higher on assignments

Assessment Method: Standardized national examinations
Performance Criteria:

A score of 80% of 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% of higher on assignments

Assessment Method: Standardized national examinations
Performance Criteria:

A score of 80% of 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% of higher on assignments

Assessment Method: Standardized national examinations
Performance Criteria:

A score of 80% of 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% of higher on assignments

Assessment Method: Standardized national examinations
Performance Criteria:

A score of 80% of 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