Montgomery County Community College
CIS 171
Switching, Routing and Wireless Essentials (Cisco Semester 2)
3-2-2

COURSE DESCRIPTION:
This course provides students with the necessary skills to design, implement, and configure network switches and routers in a converged network environment. Students will learn about the appropriate protocols and technologies to build a secure and efficient small-to-medium sized network. The implementation of wireless technology, Virtual LANs, VTP, and Inter-VLAN routing in both IPv4 and IPv6 networks will be discussed. The course will also examine network vulnerabilities and security best practices to defend against them.

PREREQUISITE(S):
CIS 170 – Introduction to Networks (Or Cisco CCNA 1 taken at any other Cisco Academy) within the past 3 years.

CO-REQUISITE(S):
None

Upon successful completion of this course, the student will be able to:

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
1. Describe basic switching concepts and the operation of Cisco switches.	Reading Lecture/Discussion In-Class Labs on CISCO Equipment Supplemented by Packet Tracer Labs Assignments	Discussion/Questions Chapter Tests Hands-on Labs Packet Tracer Labs Exam
2. Utilize enhanced switching technologies such as VLANs and STP.	Reading Lecture/Discussion In-Class Labs on CISCO Equipment Supplemented by Packet Tracer Labs Assignments	Discussion/Questions Chapter Tests Hands-on Labs Packet Tracer Labs Exam
3. Configure a small switched network.	Lecture/Discussion In-Class Labs on CISCO Equipment Supplemented by Packet Tracer Labs Reading Assignments	Discussion/Questions Chapter Tests Hands-on Labs Packet Tracer Labs Exam
4. Describe the purpose, nature, and operations	Reading Lecture/Discussion	Discussion/Questions Chapter Tests

of a router, routing tables, and the route lookup process.	In-Class Labs on CISCO Equipment Supplemented by Packet Tracer Labs Assignments	Hands-on Labs Packet Tracer Labs Exam
5. Configure IP, static and default routing.	Reading Lecture/Discussion In-Class Labs on CISCO Equipment Supplemented by Packet Tracer Labs Assignments	Discussion/Questions Chapter Tests Hands-on Labs Packet Tracer Labs Exam
6. Configure routers using a variety of technologies and protocols which will include wireless, virtual and inter-VLAN routing.	Reading Lecture/Discussion In-Class Labs on CISCO Equipment Supplemented by Packet Tracer Labs Assignments	Discussion/Questions Chapter Tests Hands-on Labs Packet Tracer Labs Exam
7. Troubleshoot problems with switches and routers using a variety of technologies and protocols.	Reading Lecture/Discussion In-Class Labs on CISCO Equipment Supplemented by Packet Tracer Labs Assignments	Discussion/Questions Chapter Tests Hands-on Labs Packet Tracer Labs Exam
8. Explain the security vulnerabilities related to routing configuration and mechanisms to protect against these threats.	Reading Lecture/Discussion In-Class Labs on CISCO Equipment Supplemented by Packet Tracer Labs Assignments	Discussion/Questions Chapter Tests Hands-on Labs Packet Tracer Labs Exam

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Director of Educational Effectiveness. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

SEQUENCE OF TOPICS:

1. **Basic Device Configuration**
    - Configure a Switch with Initial Settings
    - Configure Switch Ports
    - Secure Remote Access
    - Configure Basic Router Settings
    - Verify Directly Connected Networks

2. **Switching Concepts**
    - Configure Basic Router Settings
    - Switching Domains

3. **VLANs**
    - Overview of VLANs
    - VLANs in a Multi-Switched
    - Environment
    - VLAN Configuration
    - VLAN Trunks
    - Dynamic Trunking Protocol

4. **Inter-VLAN Routing**
    - Inter-VLAN Routing Operations
    - Configure VLAN Routing

5. **STP**
    - Purpose of STP and STP Operations
    - Evolution of STP

6. **EtherChannel**
    - EtherChannel Operations
    - Configure, Verify and Troubleshoot EtherChannel

7. **DHCPv4**
    - DHCPv4 Operation
    - Configure DHCPv4 Server
    - Configure DHCPv4 Client

8. **SLAAC and DHCPv6**
    - SLAAC and DHCPv6 Concepts and Configuration

9. FHRP Concepts

- First Hop Redundancy Purpose and Operation

10. LAN Security

- Endpoint Security
- Access Control
- Layer 2 Security Threats
- MAC Address Table Attack
- LAN Attack

11. Switch Security Configuration

- Implement Port Security
- Mitigate VLAN Attacks
- Mitigate DHCP Attacks
- Mitigate ARP Attacks
- Mitigate STP Attacks

12. WLAN Concepts

- Introduction to Wireless
- Components of WLANs
- WLAN Operation
- CAPWAP Operation
- Channel Management
- WLAN Threats
- Secure WLANs

13. WLAN Configuration

- Remote Site WLAN Configuration
- WLC Configuration
- Troubleshoot WLAN Issues

14. Routing Concepts

- Features of a Router
- Forwarding Packets from Source to Destination
- Basic Router Settings
- IP Routing Table
- Dynamic and Static Routing

15. IP Static Routing

- Configure IP Static Routes
- Configure IP Default Static
- Routes
- Configure Floating Static Routes
- Configure Static Host Routes

16. Troubleshoot Static and Default Routes

- Packet Processing with Static Routes
- Troubleshoot IPv4 Static and Default Route Configuration

LEARNING MATERIALS:
Online curriculum and assessments from Cisco Academy web portal. Provided to students with no additional charge.

(Optional)
Routing and Switching Essentials Cisco Press, 2017- ISBN-13: 978-1-58713-427-2

COURSE APPROVAL:

Prepared by: Alan Evans	Date: 3/2001
Revised by: Anil Datta	Date: 8/1/2013
VPAA/Provost or designee Compliance Verification: Victoria L. Bastecki-Perez, Ed.D.	Date: 8/7/2013
Revised by: Anil Datta	Date: 5/5/2016
VPAA/Provost or designee Compliance Verification: Victoria L. Bastecki-Perez, Ed.D.	Date: 6/2/2016
Revised by: Marie Hartlein	Date: 1/3/2020
VPAA or designee Compliance Verification:	Date: 4/27/2021

This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.