



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number NET230	Course Title Scaling Networks	Credits 3
Hours: Lecture/Lab/Other 2/2/0	Pre-requisite NET130	Implementation Semester & Year Fall 2022

Catalog description:

Study of the concepts and commands required to use routing and switching technologies together, including recommended campus network design methodologies. Topics include Layer 2 switching technologies including Spanning Tree, VLAN, frame tagging, and protocols; and Layer 3 routing services including inter-VLAN routing, multilayer switching, Hot Standby Routing Protocol (HSRP), and IP multicast. Hands-on exercises reinforce Cisco certification exam objectives.

General Education Category:
Not GenEd

Course coordinator:
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Required texts & Other materials:

Cisco – Web Material ISBN:(OER Materials)

Course Student Learning Outcomes (SLO):

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

1. Develop an in-depth, theoretical understanding required to analyze business security requirements, including strategies, structures, and processes. **Supports ILG # 4; PLO # 1, 2]**
2. Develop the knowledge and skills necessary to design, support network security, and evaluate a company's existing and planned technical environment. **Supports ILG # 2; PLO # 2, 5]**
3. Demonstrate knowledge network security that employs industry-relevant instructional approaches to prepare students for entry-level jobs in the industry **Supports ILG # 9, 11; PLO # 3, 4]**
4. Identify security risks and requirements and define security baselines. **Supports ILG # 4, 9; PLO # 3, 5]**
5. Evaluate and implement network security, including routers, firewalls and servers. **Supports ILG # 4; PLO # 1, 3]**

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 9. Ethical Reasoning and Action. Students will understand ethical frameworks, issues, and situations.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for Networks Security PLO)

1. Understand, configure, and install hardware and software, including Internet user software;
2. Understand, describe, and apply network protocols and standards;
3. Explain computing practices and procedures found in most organizations;
4. Work effectively individually and in workgroups to install and implement information technology;

- Secure routers and switches and their associated networks, including installing, troubleshooting, and monitoring network devices to maintain integrity, confidentiality, and availability of data and devices;

Units of study in detail – Unit Student Learning Outcomes:

Unit I [INTRODUCTION / Securing Networks] [Supports Course SLO # 1]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Introduction
- Critical Network Security Concepts:
- Explain Tools and Procedures
- Explain Network Security

Unit II [Network Threats] [Supports Course SLOs # 2]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Explain Effects of Malware and Common Threats
- Configure Command Authorization Privilege Levels
- Discuss Role of CLI
- Discuss Importance of Network Protection

Unit III [Mitigating Threat] [Supports Course SLO # 3]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Implement Secure Privileges
- Explain Cisco Technologies
- Secure Network Using Cisco Routers/Basic
- Explain Access Control Lists

Unit IV [Secure Device Management] [Supports Course SLO # 4]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Implement Security Management and Monitoring of Network Devices
- Configure AAA to Secure a Network
- Securing Router Part II

Unit V [Assigning Administrative Roles] [Supports Course SLO # 4]

Learning Objectives

The student will be able to...: Explain and Demonstrate

- Implement ACL's to Filter Traffic
- Implement, Mitigate Network Attacks
- Hands-on-Lab Configuration

Unit VI [Device Monitor/Management] [Supports Course SLO # 5]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Hands-on-Lab Configuration Part ii
- Device and Network Protection
- Security Appliances
- Explain Device Vulnerabilities

Unit VII [Authentication, Authorization, Account] [Supports Course SLO # 3]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Explain Authentication, Authorization
- Authentication Methods
- Biometrics Authentication Technologies
- Authorization Cumulative Access
- Examining Access Token

Unit VIII [Access Control Lists and Firewall Technologies] [Supports Course SLO # 5]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Identity and access management important to an organization
- Implement ACLs to Filter Traffic
- Implement Firewall
- Explain ACL vs Firewall

Unit IX [Zone-Based Policy Firewalls] [Supports Course SLO # 5]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Implement Zone-Based Policy Firewall using the CLI.
- Explain Basic Zone-Based Firewall Fundamentals
- Discuss Private, Public and DMZ Zones
- Explain the Difference between : Hardware, Software and Cloud Based Firewalls

Unit X [IPS Technologies, Operation / Implementation] [Supports Course SLO # 4]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Explain Intrusion Detection Systems
- Discuss Public, Private, Static and Dynamic
- Implement security measures to mitigate Layer 2 attacks.
- Explain Five Types IPS Systems

Unit XI [Endpoint Security] [Supports Course SLO # 4]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Explain Critical aspects of Endpoint Wireless Security
- Discuss Network Control: Components
- Application Control
- Browser Protection

Unit XII [Layer 2 Security Considerations] [Supports Course SLO # 3]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Introduction General Protocol Considerations
- Discuss Data Link Layer
- Spanning Tree Protocol
- Explain Security Considerations-Cisco Products
- Discuss VLAN Trunking Protocol

Unit XIII [Cryptographic Services, Basic Integrity and Authenticity] [Supports Course SLO # 4]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Introduction to Cryptography
- Explain Five Key Factors: Confidentiality, Integrity, Authentication, Authorization & Non-Repudiation
- Discuss Keys: One or Many
- Explain Encryption: Demo Encryption

Unit XIV [Public Key Cryptography, VPN, Network Testing] [Supports Course SLO # 5]

Learning Objectives

The student will be able to... Explain and Demonstrate

- Introduction to VPN
- Hands-On-Labs :
 - Zone Based Firewall
 - IPS
 - Layer 2

Evaluation of student learning:

Evaluation of student learning: [Evaluates SLOs #1, 2, 3, 4, 5]

Students' achievement of the course objectives evaluated through use of the following:

- Cisco Lab assignments assessing students' hardware comprehension skills related to the unit objectives.
- Cisco Lab Chapter quizzes assessing students' comprehension of software computer concepts related to the unit objectives.
- Research and Final Research presentation assessing students' comprehension through the use of word, PowerPoint and graphics to demonstrate knowledge
- Basic programming Labs and Quizzes assignments assessing students' basic comprehension of cyber defense and analysis functions and skills related to the unit objectives.
- Exams and Final Research Presentation assessing students' comprehension of computer concepts and applications related to the unit objectives.

Grade Criteria

Item	Percent	Description
Cisco Labs	10%	Activity-based lab Assignment Scaling Networks
Cisco Quizzes	10%	15 Question quiz for each unit of Scaling Networks Concepts
Exams	35%	3 Scaling Network Exams
Final Research Presentation	45%	Professional Scaling Networks Presentation