Montgomery County Community College
CIS 170
Introduction to Networks (Cisco Semester 1)
3-2-2

COURSE DESCRIPTION:
This course prepares the student to understand and apply basic concepts of networking technology. The OSI model, industry standards, network topologies, IP addressing, subnet masking, networking components, cabling techniques and basic network design are introduced and discussed.

PREREQUISITE(S):
Any Quantitative Reasoning Core Course or MAT100/MAT100A or permission of the instructor or coordinator

CO-REQUISITE(S):
Any Quantitative Reasoning Core Course or MAT100/MAT100A or permission of the instructor or coordinator

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

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHOD(S)
1. Use network protocol models to explain the layers of communications in data networks.	Lecture Discussion Extensive Hands-On Lab Exercises Homework Assignments Quizzes / Tests	Skills Based Assessment Final (performance) Final Exam (online)
2. Design, calculate and apply subnet addresses and masks.	Lecture Discussion Extensive Hands-On Lab Exercises Homework Assignments Quizzes / Tests	Skills Based Assessment Final (performance) Final Exam (online)
3. Build a simple Ethernet network using routers and switches.	Lecture Discussion Extensive Hands-On Lab Exercises Homework Assignments Quizzes / Tests	Skills Based Assessment Final (performance) Final Exam (online)
4. Employ basic cabling and network designs to connect devices.	Lecture Discussion Extensive Hands-On Lab Exercises Homework Assignments Quizzes / Tests	Skills Based Assessment Final (performance) Final Exam (online)

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHOD(S)
5. Use CISCO CLI commands to perform basic router and switch configuration and verification.	Lecture Discussion Extensive Hands-On Lab Exercises Homework Assignments Quizzes / Tests	Skills Based Assessment Final (performance) Final Exam (online)
6. Analyze the operation and features of the transport, application and network layer protocols and services.	Lecture Discussion Extensive Hands-On Lab Exercises Homework Assignments Quizzes / Tests	Skills Based Assessment Final (performance) Final Exam (online)
7. Build a small network.	Lecture Discussion Hands-On Lab	Project

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. **Networking Today**
   - How Networks Affect Our Lives
   - Network Components
   - Network Representations and Topologies
   - Common Types of Networks
   - Internet Connections
   - Reliable Network
   - Network Trends
   - Network Security
   - The IT Professional

2. **Basic Switch and Device Configuration**
   - Cisco IOS Access
   - IOS Navigation
   - The Command Structure
   - Basic Device Configuration
   - Save Configurations
   - Ports and Addresses
   - Configure IP Addressing

- Verify Connectivity

3. **Protocols and Models**
   - Rules of Communication
   - Network Protocols and Standards
   - Data Transfer in the Network

4. **Physical Layer**
   - Purpose and Characteristics of the Physical Layer
   - Copper Cabling
   - UTP Cabling
   - Fiber Optic Cabling
   - Wireless Media

5. **Number Systems**
   - Binary and Hexadecimal

6. **Data Link Layer**
   - Purpose of the Data Link Layer
   - Topologies
   - Data Forms

7. **Ethernet Switching**
   - Ethernet Frame
   - MAC Address and Table
   - Switch Speeds and Forwarding Methods

8. **Network Layer**
   - Network Layer Characteristics
   - IPv4 Packet
   - IPv6 Packet
   - How a Host Routes
   - Router Rounding Tables

9. **Basic Router Configuration**
   - Configure Initial Router Setup
   - Configure Interfaces
   - Configure the Default Gateway

10. IPv4 Addressing

- IPv4 Address Structure
- IPv4 Unicast, Broadcast, and
- Multicast
- Types of IPv4 Addresses
- Network Segmentation
- Subnet an IPv4 Network
- Subnet a /16 and /8 Prefix
- Subnet to Meet Requirements
- Variable Length Subnet Masking
- Structured Design

11. IPv6 Addressing

- IPv4 Issues
- IPv6 Addressing
- Types of IPv6 Addresses
- IPv6 Unicast Addresses
- Dynamic IPv6 Unicast Addresses
- IPv6 Multicast Addresses
- Subnet an IPv6 Network

12. ICMP

- ICMP Messages
- Ping and Traceroute Testing

13. Transport Layer

- Transportation of Data
- TCP and UDP Overview
- TCP Communication Process
- Reliability and Flow Control
- UDP Communication

14. Application Layer

- Application, Session, and Presentation
- Peer-to-Peer
- Web and Email Protocols

15. Network Security Fundamentals

- Security Threats and
- Vulnerabilities
- Network Attacks
- Network Attack Mitigation
- Device Security

16. Build a Small Network

- Devices in a Small Network
- Small Network Applications and
- Protocols
- Scale to Larger Networks
- Verify Connectivity
- Show Commands
- Host and IOS Commands
- Troubleshooting Methodologies
- Troubleshooting Scenarios

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

COURSE APPROVAL:
Prepared by: Alan Evans Date: 3/2001
Revised by: Karon Crickmore Date: 3/2009

Revised by: Marie Hartlein Date: 4/1/2013
VPAA/Provost or designee Compliance Verification:
Victoria L. Bastecki-Perez, Ed.D. Date: 5/2013

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
Interim VPAA or designee Compliance Verification:
Gloria Oikelome, Ed.D. Date: 1/3/2020

Revised by: Marie Hartlein Date: 4/27/2020
Provost or designee Compliance Verification: Date: 8/26/2020

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.