SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electronic Systems Technology Program
Revision Date: August 23, 2021

I. CATALOG DESCRIPTION

Course Number:	ELEC2760
Course Title	Introduction to Networks
Prerequisite(s):	None
Catalog Description:	CCNAv7: Introduction to Networks (ITN) covers the architecture, structure, functions and components of the Internet and other computer networks. Students achieve a basic understanding of how networks operate and how to build simple local area networks (LAN), perform basic configurations for routers and switches, and implement Internet Protocol (IP).
Credit Hours:	3
Class Hours:	38
Lab Hours:	23
Total Contact Hours:	61

II. COURSE OBJECTIVES: *Course will:*

A. Apply architecture, structure, functions, components, and models of the Internet and other computer networks.

B. Introduce the principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations to provide a foundation for the curriculum.

C. Allow students to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.

D. Associate OSI and TCP/IP models for networking and apply to network design for troubleshooting of networks.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

A. Student Learning Outcomes: *Student will be able to:*

1. Configure switches and end devices to provide access to local and remote network resources.

2. Compare physical and data link layer protocols support the operation of Ethernet in a switched network.

3. Configure routers to enable end-to-end connectivity between remote devices.

4. Create IPv4 an IPv6 addressing schemes and verify network connectivity between devices.

5. Explain how the upper layers of the OSI model support network applications.

6. Configure a small network with security best practices.

7. Troubleshoot connectivity in a small network.

B. General Education Learning Outcomes (GELOs)

1. GELO #3: Critical Thinking & Problem Solving
Outcome 2: Synthesize information to arrive at reasoned solutions to problems.

IV. CONTENT/TOPICAL OUTLINE

A. Networking Today

1. How networks affect our Lives

2. Network components

3. Topologies
4. Reliable networks
5. Network trends

B. Basic Switch and End Device Configuration
1. Cisco IOS
2. Command structure
3. Basic device configuration
4. Ports and addresses
5. Configure IP addressing
6. Testing

C. Protocols and Models
1. Protocol Suites
2. Standard Organizations
3. Reference Models
4. Data encapsulations
5. Data Access

D. Physical Layer
1. Purpose of physical layer
2. Characteristics
3. Copper cabling
4. UTP cabling
5. Fiber-optic Cabling
6. Wireless Media

E. Number Systems
1. Binary
2. Hex

F. Data Link Layer
1. Purpose of Data Link Layer
2. Topologies
3. Data Link Frame

G. Ethernet Switching
1. Ethernet frames
2. MAC Address
3. MAC address table
4. Switch speeds and Forwarding Methods

H. Network Layer
1. Network layer characteristics
2. IPc4 Packet
3. IPv6 Packet
4. How a host route
5. Introduction to routing

I. Address Resolution
1. MAC and IP
2. ARP
3. IPv6 Neighbor discovery

J. Basic Router Configurations
1. Router configuration
2. Configure interfaces
3. Configure the default gateway

K. IPv4 Addressing
1. Address Structure

2. Unicast, Broadcast and Multicast
3. Subnet an Iv4 network
4. VLSM
5. Structured design

L. IPv6 Addressing
1. IPv4 Issues
2. IPv6 Address representation
3. Pv6 types of addresses
4. GUA and LLA static Configuration
5. Dynamic addressing for IPv6 GUAs and LLAs
6. IPv6 Multicast Addresses
7. Subnet IPv6 Networks

M. ICMP
1. ICMP messages
2. Ping and Traceroute test

N. Transport Layer
1. TCP and UDP overview
2. Port numbers
3. TCP communication process
4. Reliability and Flow controls
5. UDP communications

O. Application Layer
1. Application, Presentation and Session
2. Peer-to-Peer
3. Web and email protocols
4. IP addressing services
5. File sharing services

P. Network security Fundamentals
1. Security threats and vulnerabilities
2. Network attacks and Mitigations
3. Devices security

Q. Build a Small Network
1. Devices in a small network
2. Scale to larger network
3. Verify connectivity
4. Troubleshooting

R. CCNA Exploration-Introduction to Networks Hands On and Written Final Exams

V. INSTRUCTIONAL MATERIALS

A. Required Text(s): None, all reading material online via Netacad.com

B. Other Resources: Online curriculum CCNA Exploration-Introduction to Networks, Computers (server and workstation) and Routers, and Various Internet sites

VI. METHODS OF PRESENTATION/INSTRUCTION

A. Methods of presentation typically include a combination of the following:
1. Technology enhanced lecture
2. Classroom discussion
3. Interactive group activities
4. Audio visual materials
5. Presentation by experts for the Electronics and Networking industry

6. Configuration and setting up network equipping both hardware and/or emulation software

VII. METHODS OF EVALUATION

A. Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:

1. Attendance and participation
2. Daily assignments
3. Written exams and/or quizzes
4. Performance and observational assessment

VIII. SPECIFIC COURSE REQUIREMENTS

A. Minimum grade of 60% is required.
B. All students must pass Student Based Assessment (SBA or Lab Test) to receive a grade for the class, failure to complete SBA is automatic failing grade for the class.
C. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination