

OHLONE COLLEGE
Ohlone Community College District
OFFICIAL COURSE OUTLINE

I. Description of Course:

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| 1. Department/Course: <u>CNET - 155A</u> | 7. Degree/Applicability:
Credit, Degree Applicable, Transferable
- CSU (T) |
| 2. Title: <u>Introduction to Networks
(CCNA1)</u> | 8. General Education: |
| 3. Cross Reference: | 9. Field Trips: <u>Not Required</u> |
| 4. Units: <u>3</u>
Lec Hrs: <u>2</u>
Lab Hrs: <u>4</u>
Tot Hrs: <u>108.00</u> | 10. Requisites: |
| 5. Repeatability: <u>No</u> | |
| 6. Grade Options: Grade Only (GR) | |

12. Catalog Description:

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The course uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. At the end of the course, students build simple LAN topologies by applying basic principles of cabling; performing basic configurations of network devices, including routers and switches; and implementing IP addressing schemes. This course is preparation for the CCENT and CCNA certification exams.

13. Class Schedule Description:

Networking terminology, protocols standards, cabling. Preparation for CCENT and CCNA.

14. Counselor Information:

Curriculum is delivered online through Ohlone's Cisco Networking Academy program established in 1998.

II. Student Learning Outcomes

The student will:

1. Describe the devices and services used to support communications in data networks and the Internet.
2. Describe the role of protocol layers in data networks.
3. Describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments.
4. Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks.
5. Explain fundamental Ethernet concepts such as media, services, and operations.

6. Build a simple Ethernet network using routers and switches.
7. Use Cisco command-line interface (CLI) commands to perform basic router and switch configurations.
8. Utilize common network utilities to verify small network operations and analyze data traffic.

III. **Course Content:**

A. Exploring the Network

1. Introduction
2. Globally Connected
3. LANs, WANs, and the Internet
4. The Network as a Platform
5. The Changing Network Environment
6. Lab - Researching Network Collaboration Tools - ILM
7. Lab - Researching Converged Network Services - ILM

B. Configuring a Network Operating System

1. IOS Bootcamp
2. Getting Basic
3. Address Schemes
4. Lab - Establishing a Console Session with Tera Term
5. Lab - Building a Simple Network
6. Lab - Configuring a Switch Management Address
7. Packet Tracer - Navigating the IOS Instructions
8. Packet Tracer - Configuring Initial Switch Settings Instructions
9. Packet Tracer - Implementing Basic Connectivity Instructions

C. Network Protocols and Communications

1. Rules of Communication
2. Network Protocols and Standards
3. Moving Data in the Network
4. Lab - Using Wireshark to View Network Traffic
5. Lab - Researching Networking Standards
6. Packet Tracer - Investigating the TCP-IP and OSI Models in Action

D. Network Access

1. Physical Layer Protocols
2. Network Media
3. Data Link Layer Protocols
4. Media Access Control
5. Lab - Identifying Network Devices and Cabling
6. Lab - Building an Ethernet Crossover Cable
7. Lab - Viewing Wired and Wireless NIC Information
8. Packet Tracer – Connecting a Wired and Wireless

E. Ethernet

1. Ethernet Protocol
2. Address Resolution Protocol
3. LAN Switches
4. Lab - Viewing Network Device MAC Addresses
5. Lab – Using Wireshark to Examine Ethernet Frames
6. Lab – Observing ARP with Windows CLI, IOS CLI and Wireshark

7. Lab - Using IOS CLI with Switch MAC Address Tables
8. Lab - MAC and Choose Instructions IG
9. Packet Tracer – Identify MAC and IP Addresses
10. Packet Tracer – Examine the ARP Table

F. Network Layer

1. Network Layer Protocols
2. Routing
3. Routers
4. Configuring a Cisco Router
5. Lab - Exploring Router Physical Characteristics
6. Lab - Building a Switch and Router Network
7. Packet Tracer – Configuring Initial Router Settings
8. Packet Tracer - Connect a Router to a LAN

G. Transport Layer

1. Transport Layer Protocols
2. TCP and UDP
3. Lab – Using Wireshark to Observe the TCP 3-Way Handshake
4. Lab - Using Wireshark to Examine a UDP DNS Capture
5. Lab - Using Wireshark to Examine FTP and TFTP Captures

H. IP Addressing

1. IPv4 Network Addresses
2. IPv6 Network Addresses
3. Connectivity Verification
4. Lab – Identifying IPv4 Addresses
5. Lab – Identifying IPv6 Addresses
6. Lab – Configuring IPv6 Addresses on Network Devices
7. Packet Tracer – Configuring IPv6 Addressing
8. Packet Tracer – Verifying IPv4 and IPv6 Addressing

I. Subnetting IP Networks

1. Subnetting an IPv4 Network
2. Addressing Schemes
3. Design Considerations for IPv6
4. Lab – Calculating IPv4 Subnets
5. Lab – Subnetting Network Topologies
6. Lab - Designing and Implementing a VLSM Subnetted IPv4 Addressing Scheme
7. Packet Tracer - Subnetting Scenario 1
8. Packet Tracer - Subnetting Scenario 2

J. Application Layer

1. Application Layer Protocols
2. Well-Known Application Layer Protocols and Services
3. The Message Heard Around the World
4. Lab - Researching Peer-to-Peer File Sharing
5. Lab - Observing DNS Resolution
6. Lab - Exploring FTP
7. Packet Tracer - Web and Email
8. Packet Tracer - DNS and DHCP
9. Packet Tracer - FTP

K. It's a Network

1. Create and Grow
2. Keeping the Network Safe
3. Basic Network Performance
4. Managing IOS Configuration Files
5. Integrated Routing Services
6. Lab - Accessing Network Devices with SSH – ILM
7. Lab - Securing Network Devices – ILM
8. Lab - Managing Device Configuration Files Using TFTP

IV. **Course Assignments:**

A. Reading Assignments

1. Textbook readings and online supporting webpages to inform the student on the architecture, structure, functions, components, and models of the Internet and other computer networks.

B. Projects, Activities, and other Assignments

1. Hands-on lab assignments using the Ohlone NetLAB to develop skills building a simple LAN topologies by applying basic principles of cabling; performing basic configurations of network devices, including routers and switches; and implementing IP addressing schemes. Troubleshooting non-expected outcomes.

C. Writing Assignments

1. Worksheets and Lab Reports to support the lab assignments and document the results of those lab assignments.

V. **Methods of Evaluation:**

- A. Objective quizzes on: the architecture, structure, functions, components, and models of the Internet and other computer networks; the nature and roles of protocols and services at the application, network, data link, and physical layers; and the principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations.
- B. Lab Projects to demonstrate competency in building simple LAN topologies by applying basic principles of cabling; performing basic configurations of network devices, including routers and switches; and implementing IP addressing schemes.
- C. Comprehensive Final Exam on introductory networking topics, and preparation for the Cisco Certified Entry-level Network Technician (CCENT) and Cisco Certified Network Associate (CCNA) certification examinations.
- D. Skills-based assessment (hands-on final exam) on building simple LAN topology, configuring devices, and applying IP addressing.

VI. **Methods of Instruction:**

- A. Lecture
- B. Laboratory
- C. Discussion
- D. Demonstration
- E. Distance Learning
- F. Web-enhanced

VII. **Textbooks:**

Recommended

1. Various *Introduction to Networks* 1st Edition, Cisco Press, 2013 ISBN: 1587133164 / 97

Supplemental

VIII. Supplies:

Approval Date: 10/15/2014
CCC Number: CCC000559474
TOP Codes:
0708.10
C-ID Number: ITIS 150