

Cerro Coso College
Course Outline of Record Report
 10/12/2021

CSCIC143 : Computer Network Fundamentals

General Information

Author:	-
Course Code (CB01) :	CSCIC143
Course Title (CB02) :	Computer Network Fundamentals
Department:	Business Information Technolog
Proposal Start:	Fall 2013
TOP Code (CB03) :	(0702.00) Computer Information Systems
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	Yes
Course Control Number (CB00) :	CCC000504267
Curriculum Committee Approval Date:	04/03/2015
Board of Trustees Approval Date:	05/07/2015
External Review Approval Date:	06/08/2015
Course Description:	This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP (Internet Protocol) addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for further study of computer networks. It uses the OSI (Open Systems Interconnection) and TCP (Transmission Control Protocol) layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. This course prepares students for the current version of CompTIA's Network+ certification exam.
Submission Type:	New Course
Author:	No value

Faculty Minimum Qualifications

Master Discipline Preferred:	No value
Alternate Master Discipline Preferred:	No value
Bachelors or Associates Discipline Preferred:	<ul style="list-style-type: none"> • Computer Information Systems (Computer network installation, microcomputer technology, computer applications)
Additional Bachelors or Associates Discipline Preferred:	No value

Course Development Options

Basic Skills Status (CB08) Course is not a basic skills course.	Course Special Class Status (CB13) Course is not a special class.	Grade Options <ul style="list-style-type: none"> • Letter Grade Methods • Pass/No Pass
	Allowed Number of Retakes	Course Prior To College Level (CB21)

Allow Students to Gain Credit by Exam/Challenge

Allowed Number of Retakes

0

Course Prior to College Level (CB21)

Not applicable.

Rationale For Credit By Exam/Challenge

No value

Retake Policy Description

Type:|Non-Repeatable Credit

Allow Students To Audit Course

Course Support Course Status (CB26)

No value

Associated Programs

Course is part of a program (CB24)

Associated Program

Award Type

Active

Cyber Security Technology

A.S. Degree Major

Spring 2018

Cyber Security Technician

Certificate of Achievement

Spring 2018

Information Technology Plus

Certificate of Achievement

Spring 2018 to Summer 2019

CC Computer Information Systems-

Certificate of Achievement

Spring 2018 to Summer 2019

CC Computer Information Systems

A.S. Degree Major

Spring 2018 to Summer 2019

CC Information Technology

Certificate of Achievement

Summer 2019

CC Information Technology

A.S. Degree Major

Summer 2019

Linux Operating System

Certificate of Achievement

Fall 2020

Cloud Computing

Certificate of Achievement

Fall 2020 to Spring 2021

Transferability & Gen. Ed. Options

Course General Education Status (CB25)

No value

Transferability

Transferable to CSU only

Transferability Status

Approved

Units and Hours:**Summary**

Minimum Credit Units (CB07)	3
Maximum Credit Units (CB06)	3
Total Course In-Class (Contact) Hours	90
Total Course Out-of-Class Hours	72
Total Student Learning Hours	162
Faculty Load	0

Credit / Non-Credit Options**Course Credit Status (CB04)**

Credit - Degree Applicable

Course Non Credit Category (CB22)

Credit Course.

Non-Credit Characteristic

No Value

Course Classification Status (CB11)

Credit Course.

 Variable Credit Course**Funding Agency Category (CB23)**

Not Applicable.

 Cooperative Work Experience Education Status (CB10)**Weekly Student Hours**

	In Class	Out of Class
Lecture Hours	2	4
Laboratory Hours	3	0
Activity Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	
Lecture	0
Laboratory	0
Activity	0
Total	90
Course Out-of-Class Hours	
Lecture	0
Laboratory	0
Activity	0
Total	72

Time Commitment Notes for Students

No value

Faculty Load

Extra Duties: 0

Faculty Load: 0

Units and Hours: - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

CSCIC142 - Information & Communication Technology Essentials

Students need to know the essential skills for individual computer repair to assist them as they complete the skills for an Information Technology Technician. These skills include computer hardware identification and basics of building a computer to include installation of components (power supplies, motherboards, processor, memory, and expansion card). In addition students need to have experience and knowledge of installing and configuring operating systems, application software and updates. This material is covered in the CSCI C142 course.

Entrance Skills

Entrance Skills	Description
No value	No value

Limitations on Enrollment

Limitations on Enrollment	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction

Outside reading

Rationale

Textbook and Electronic Readings
Other Methods: A. Textbook and Electronic Readings
B. Pre-recorded Training Videos
C. Real-time Lectures
D. Discussions
E. Lab Scenarios

Methods of Instruction

Audiovisual

Rationale

Pre-recorded Training Videos

Methods of Instruction

Laboratory

Rationale

No value

Methods of Instruction

Lecture

Rationale

No value

Methods of Instruction

Skills Development and Performance

Rationale

No value

Methods of Instruction

Discussion

Rationale

No value

Methods of Instruction

Demonstration

Rationale

No value

Assignments

A. Chapter reading (Example: Reading the assigned chapters from the textbook based on the topics for the week).

B. Weekly step-by-step assignments (Example - Explain basic concepts related to network management.).

C. Weekly application simulations assignments (Example: Identify components of a Transmission Control Protocol/Internet Protocol (TCP/IP) packet using Wireshark and command line tools.)

Methods of Evaluation

Rationale

Final Exam

Comprehensive Exam: A comprehensive exam in a proctored environment will evaluate a student's preparedness for the Net+ exam. Example: Multiple choice and essay question exam covering all concepts of the course.

Participation

Discussions: Students will participate in discussions to critically explore concepts and compare elements of the text. Example: Discuss how a network technician may design a network using various topologies.

Participation

Hands on labs: Activities will reinforce the practical application of theories presented in the text. Labs will also provide insight and training into real world tasks for Network Technicians. Example: Use Windows networking utilities (IP Config and Ne

Tests

Objective Exams: Objective exams will evaluate the student's comprehension of text material and prepare them for the Net+ certification exam environment. Example: Multiple choice and essay question exam covering computer network configuration and set

Equipment

No Value

Textbooks

Author

Title

Publisher

Date

ISBN

Tamara D. . (2013) Network+ Guide to Networks, 6th, Thomson Course Technology Incorporated.

Other Instructional Materials

No Value

Materials Fee

No

Learning Outcomes and Objectives

Course Objectives

No value

CSLOs

Demonstrate knowledge of networking concepts such as Internet Protocol (IP) addressing, sub-netting, and the logical and physical network topologies. Expected SLO Performance: 70.0

Identify target information or configuration requirements and perform requested actions in a skill demonstration scenario.

Expected SLO Performance: 70.0

Business Information Technolog
Computer Information Systems A.A. Degree
for Transfer

3. Demonstrate competency in networking and convergence including the ability to design, analyze, and support computer networks.

Analyze and design a simple Ethernet network using routers and switches.

Expected SLO Performance: 70.0

Differentiate among challenging technical concepts among a group of peers to analyze potential common networking issues.

Expected SLO Performance: 70.0

Describe how to provide appropriate customer support as a network technician.

Expected SLO Performance: 70.0

Outline

Course Outline

A. Objectives:

1. Describe and differentiate 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. Evaluate 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. Compose Cisco command-line interface (CLI) commands to perform basic router and switch configurations.
8. Experiment with common network utilities to verify small network operations and analyze data traffic.

A. An Introduction to Networking

- a. Advantages of networked computing relative to stand-alone computing
- b. Client/server and peer-to-peer networks differences
- c. Elements common to all client/server networks
- d. Several specific uses for a network
- e. Certifications available to networking professionals
- f. Skills and specializations that helps networking professional to excel

B. Networking Standards and the Open System Interconnection (OSI) Model

- a. Organizations that set standards for networking
- b. Purpose of the OSI model and each of its layers
- c. Specific functions for each OSI model layer
- d. How two network nodes communicate through the OSI model
- e. Structure and purpose of data packets and frames
- f. Two types of addressing covered by the OSI model

C. Transmission Basics and Networking Media

- a. Basic data transmission concepts, including full duplexing, attenuation, latency, and noise
- b. Physical characteristics of coaxial cable, Shielded Twisted Pair (STP), Unshielded Twisted Pair (UTP), and fiber-optic media
- c. Benefits and limitations of different networking media
- d. Principles behind and uses for serial cables
- e. Wiring standards and the best practices for cabling buildings and work areas

D. Introduction to Transmission Control Protocol/Internet Protocol (TCP/IP) Protocols

- a. Purpose and implementation of Domain Name System (DNS)
- b. Well-known ports for key TCP/IP services
- c. Common Application layer TCP/IP protocols are used

E. Topologies and Ethernet Standards

- a. Basic and hybrid Local Area Network (LAN) topologies, and their uses, advantages, and disadvantages
- b. Backbone structures that form the foundation for most networks

- c. Different types of switching used in data transmission
- d. Nodes on Ethernet networks share a communications channel
- e. Characteristics of several Ethernet standards
- F. Network Hardware, Switching, and Routing
 - a. Functions of LAN connectivity hardware
 - b. Install, configure, and differentiate between network devices such as Network Interface Controller (NICs), hubs, bridges, switches, routers, and gateways
 - c. Advanced features of a switch and understand popular switching techniques, including Virtual Local Area Network (VLAN) management
 - d. Purposes and properties of routing
 - e. Common Internet Protocol version 4 (IPv4) and Internet Protocol version 6 (IPv6) routing protocols
- G. Wide Area Networks (WAN)
 - a. Uses for WANs
 - b. Different WAN topologies, including their advantages and disadvantages
 - c. Characteristics of WAN technologies, including their switching type, throughput, media, security, and reliability
 - d. WAN transmission and connection methods, including Public Switched Telephone Network (PSTN), Integrated Services Digital Network (ISDN), T-carriers, Digital subscriber line (DSL), broadband cable, broadband over powerline, Automated Teller Machine (ATM), and Synchronous Optical Network (SONET)
- H. Wireless Networking
 - a. How nodes exchange wireless signals
 - b. Potential obstacles to successful wireless transmission and their repercussions, such as interference and reflection
 - c. Wireless LAN (WLAN) architecture
 - d. Characteristics of popular WLAN transmission methods, including 802.11 a/b/g/n
 - e. Install and configure wireless access points and their clients
 - f. Wireless WAN technologies, including 802.16 (WiMAX), High Speed Packet Access (HSPA+), Long-Term Evolution (LTE), and satellite communications
- I. In-Depth TCP/IP Networking
 - a. Methods of network design unique to TCP/IP networks, including subnetting, Classless Inter-Domain Routing (CIDR), and address translation
 - b. Differences between public and private TCP/IP networks
 - c. Protocols used between mail clients and mail servers, including Simple Mail Transfer Protocol (SMTP), Post Office Protocol (POP3), and Internet Message Access Protocol (IMAP4)
 - d. Multiple TCP/IP utilities for network discovery and troubleshooting
 - e. Dynamic Host Configuration Protocol (DHCP) uses for dynamic network addressing
- J. Virtual Networks and Remote Access
 - a. Virtualization and identify characteristics of virtual network components
 - b. Virtual servers, adapters, and switches as part of a network
 - c. Techniques for incorporating virtual components in VLANs
 - d. Methods for remotely connecting to a network, including dial-up networking, virtual desktops, and thin clients
 - e. Virtual Private Networks (VPNs) and the protocols
 - f. Features and benefits of cloud computing and Network as a Service (NaaS)
- K. Network Security
 - a. Security threats and vulnerabilities in LANs and WANs and design security policies that minimize risks
 - b. Security measures for network hardware and design, including firewalls, intrusion detection systems, and scanning tools
 - c. Methods of encryption, such as Secure Sockets Layer (SSL) and Internet Protocol Security (IPSec), that can secure data in storage and in transit
 - d. How user authentication protocols, such as Public Key Infrastructure (PKI), Remote Authentication Dial In User Service (RADIUS), Terminal Access Controller Access Control System (TACACS+), Kerberos, Challenge-Handshake Authentication Protocol (CHAP), Microsoft version of the Challenge-Handshake Authentication Protocol (MS-CHAP), and Extensible Authentication Protocol (EAP) function
 - e. Network operating system techniques to provide basic security
 - f. Wireless security protocols, such as Wired Equivalent Privacy (WEP), Wi-Fi Protected Access (WPA), and 802.11i
- L. Voice and Video Over IP
 - a. Terminology specific to converged networks
 - b. Voice over IP (VoIP) services, Private Branch Exchange (PBXs), and their user interfaces
 - c. Video-over-IP services and their user interfaces
 - d. VoIP and video-over-IP signaling and transport protocols, including Session Initiation Protocol (SIP), H.323, and Real-time Transport Protocol (RTP)
 - e. Quality of Service (QoS) assurance methods critical to converged networks, including Resource Reservation Protocol (RSVP) and Differentiated services (DiffServ)
- M. Troubleshooting Network Problems
 - a. Steps involved in an effective troubleshooting methodology
 - b. Systematic troubleshooting process to identify and resolve networking problems
 - c. Symptoms, solutions, and results when troubleshooting network problems and documentation procedures

- d. Variety of software and hardware tools to diagnose problems
- N. Ensuring Integrity and Availability
 - a. Characteristics of a network that keep data safe from loss or damage
 - b. Enterprise-wide network from malware protection
 - c. Fault-tolerance techniques for storage, network design, connectivity devices, naming and addressing services, and servers
 - d. Best practices for network backup and recovery
 - e. Components of a useful disaster recovery plan and the options for disaster contingencies
- O. Network Management
 - a. Basic concepts related to network management
 - b. Importance of documentation, baseline measurements, policies, and regulations in assessing and maintaining a network's health
 - c. Performance of Simple Network Management Protocol (SNMP)-based network management software, system and event logs, and traffic-shaping techniques
 - d. Reasons for and elements of an asset management system
- e. Regular hardware and software maintenance routines

Lab Outline

- A. Transmission Basics and Networking Media
 - a. Packet flow with Wireshark.
 - b. MAC) addresses.
- B. Introduction to Transmission Control Protocol/Internet Protocol (TCP/IP)
 - a. Component identification of a TCP/IP packet using Wireshark and command line tools.
 - b. Domain Name System (DNS) server name determination.
 - c. Querying a DNS server manually.
- C. Network Hardware, Switching, and Routing
 - a.
 - b. Simulator usage to setup networks and isolate traffic isolation.
- D. In-Depth TCP/IP Networking
 - a. Windows networking utilities (IPConfig and Netstat) for TCP/IP setup.
- E. Network Management
 - a. Design a corporate network using software (Visio) and implement it using a simulator.

Delivery Methods and Distance Education

Delivery Method: Please list all that apply -Face to face -Online (purely online no face-to-face contact) -Online with some required face-to-face meetings ("Hybrid") -Online course with on ground testing -iTV – Interactive video = Face to face course with significant required activities in a distance modality -Other

Face 2 Face
 Online
 Hybrid

Rigor Statement: Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used. For instance, if labs, field trips, or site visits are required in the face to face section of this course, how will these requirements be met with the same rigor in the Distance Education section?

All assignments in distance education courses (online, hybrid and iTV) of CSCI C143 are of the same rigor as those in the on-ground course, except that students in purely online sections will submit all of their assignments virtually. Labs are provided fo

Effective Student-Instructor Contact: Good practice requires both asynchronous and synchronous contact for effective contact. List the methods expected of all instructors teaching the course. -Learning Management System -Discussion Forums -Moodle Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV -Interactive Video -Other (specify)

contact_moodle_forums
contact_moodle_message
contact_chat
contact_email

Software and Equipment: What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

No Value

Accessibility: Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden". I am using -iTV—Interactive Video only -Learning management system -Publisher course with learning management system interface.

s508_itv
s508_moodle
s508_publisher

Class Size: Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

No Value