CNSE M18: CISCO SYSTEM COMPUTER NETWORKING A

Originator
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Co-Contributor(s)

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College
Moorpark College

Discipline (CB01A)
CNSE - Computer Netwrk Sys. Engr. Prg

Course Number (CB01B)
M18

Course Title (CB02)
Cisco System Computer Networking A

Banner/Short Title
Cisco Sys Comp Netwrking A

Credit Type
Credit

Start Term
Fall 2021

Catalog Course Description
Provides introduction to architecture, structure, functions and components of digital networks. Introduces wireless local area networks (WLAN) and network security concepts. Covers how networks operate and perform basic configurations for routers and switches, and implement Internet Protocol (IP). Covers operations on routers and switches including troubleshooting network equipment while configuring advanced functionality using security best practices.

Additional Catalog Notes
Course prepares students for the Cisco Certification Exam.

Taxonomy of Programs (TOP) Code (CB03)
0708.00 - *Computer Infrastructure and Support

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
B (Transferable to CSU only)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
C - Clearly Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
Y - Credit Course

Funding Agency Category (CB23)
Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)
1 - Program Applicable

General Education Status (CB25)
Y - Not Applicable

Support Course Status (CB26)
N - Course is not a support course

Field trips
Will not be required

Grading method
Letter Graded

Alternate grading methods
Student Option- Letter/Pass
Pass/No Pass Grading

Does this course require an instructional materials fee?
No

Repeatable for Credit
No

Is this course part of a family?
No

Units and Hours

Carnegie Unit Override
No

In-Class

Lecture
Minimum Contact/In-Class Lecture Hours
35
Maximum Contact/In-Class Lecture Hours
35

Activity

Laboratory
Minimum Contact/In-Class Laboratory Hours
105

Maximum Contact/In-Class Laboratory Hours
105

Total in-Class

Total in-Class
Total Minimum Contact/In-Class Hours
140
Total Maximum Contact/In-Class Hours
140

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class
Minimum Outside-of-Class Hours
70
Maximum Outside-of-Class Hours
70

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
210
Total Maximum Student Learning Hours
210

Minimum Units (CB07)
4
Maximum Units (CB06)
4

Advisories on Recommended Preparation
CNSE M01 or CNSE M05

Requisite Justification
Requisite Type
Recommended Preparation

Requisite
CNSE M01 or CNSE M05

Requisite Description
Course not in a sequence

Level of Scrutiny/Justification
Content review

Student Learning Outcomes (CSLOs)

Upon satisfactory completion of the course, students will be able to:

1	troubleshoot and correct problems associated with device, router, and switch configurations.
2	implement router and switch network device security features to properly lockdown and secure devices including access restrictions and connectivity restrictions.
3	implement IP services including DHCP options, various access control lists, and various NAT configurations.
4	implement and differentiate between various routing protocols; intervlan switching configurations via CLI to support device management and verify configuration and network connectivity.
5	implement IP addressing to support various configurations including VLSM and deployment of NAT, DHCP, DNS, IPV6 and use of static addressing.
6	implement switch security, port negotiation, and switch management including using tools such as ping, traceroute, telnet, SSH, arp, ipconfig, debug, and show commands.
7	implement various configuration management to support segmentation in a Cisco switched network including media, cables, ports, for Ethernet.
8	describe the operation of Lan/Wan data networks including devices, OSI/TCPIP models, network applications, protocols, paths across networks, components required, and distinguish functions between layers 1,2,3 and 7.
9	install, operate, and troubleshoot a small branch office network while applying various types of network routing.
10	configure and troubleshoot EtherChannel on switched networks.

Course Objectives

Upon satisfactory completion of the course, students will be able to:

1	configure and troubleshoot Access Control Lists (ACL) and the application of Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS) and Internet Protocol version 4 and 6, and Network Address Translation (NAT).
2	describe the basic functions that occur at each layer of the OSI model and describe how the data link layer provides reliable transit of data across a physical link by using the Media Access Control (MAC) addresses.
3	describe VLAN Trunking Protocol, Rapid Spanning Tree, and Per-VLAN Spanning Tree Protocol and 802.1q Protocol.
4	enable the IP routing protocols of EIGRP, and OSPF, then configure and troubleshoot static, default, and dynamic routing, including using OSPF routing protocol.
5	configure and troubleshoot a small switched network, VLAN, and inter-VLAN routing on layer 3 devices.
6	describe the operations of a router, a router's routing table, and lookup process, static and dynamic routing protocols, distance vector and link state protocols.
7	identify IP address classes, network and node addresses, and subnet masking so as to describe how routers use a layer 3 addressing scheme.
8	explain the primary functions that occur at the transport layer, which includes end-to-end control provided by sliding windows and the reliability in sequencing numbers and acknowledgments.
9	describe how the application layer deals with data packets from client-server applications, domain name services, and network applications.
10	describe basic switching concepts, role of VLANs in separate networks and routing between them and apply troubleshooting to resolve issues.
11	describe the correct procedures and commands to access a router, examine and maintain its components, and test its network connectivity.
12	use a variety of Cisco IOS software source options, execute commands to load Cisco IOS software onto the router, maintain backup files, and upgrade Cisco IOS software.
13	describe the difference between routing versus routed protocols and how routers track distance between locations.
14	configure redundancy on a switched network using STP and EtherChannel.
15	describe how to support available and reliable networks using dynamic addressing and first-hop redundancy protocols.

Course Content

Lecture/Course Content
10% - Configuration - Router and Switch configuration settings:
- router and switch configuration including basic settings
- router and switch configuration best practices

- security features and best practices for security lock down
- gui features
- navigating command line

10% - Network Address Translation (NAT):
- static NAT
- dynamic NAT
- port Address Translation (PAT)
- nat overload

15% - Static Routing:
- configuration of specific static routes
- summary routes
- floating routes
- default routes
- route table analysis

5% - Dynamic Host Configuration Protocol (DHCP):
- dhcp version 4
- dhcp version 6
- stateful and stateless DHCP access control list

5% - Troubleshooting including IP versions 4 and 6:
- ping
- tracert
- ipconfig
- sho commands

15% - Access Control Lists (ACL):
- placement, and Virtual Terminal line (VTY) restrictions
- access Control Lists (ACL) including ACL operations
- standard and extended ACL
- named ACL
- troubleshooting ACLs
- analyzing IP Version 6 ACLs

10% - Subnetting/Segmenting Networks:
- classless inter domain routing (CIDR)
- variable length subnet masks (VLSM)

10% - Routing Protocols:
- distance vector protocols
- next generation protocols
- link state protocols

15% - Inter-Virtual Local Area Network Routing (VLAN):
- routing between vlans
- layer 3 switching
- per interface vlan routing
- 802.1q trunking
- vlan segmentation
- vlan security
- managing vlans and trunking

5% - Review wireless controllers:
- manage a group of wireless access points within an enterprise
- wireless security
- wireless configuration

Laboratory or Activity Content

Note: Labs are completed using 3 strategies to reflect job market (simulation for lab planning/staging, remote for remote network administration, and live for real world close proximity equipment problem solving: Use Cisco Packet Tracer for simulation, Practice Labs for online remote configuration confidence building and Cisco Classroom Tech T212 using real Router and Switches with preinstalled Cisco Internetwork Security Operating Systems.

10% - Router and Switch configuration settings:

- understanding router and switch configuration to support settings
- apply configuration best practices
- apply security features and best practices
- understand gui setup and navigational features
- understand how to navigate features via command line

10% - Network Address Translation (NAT):

- apply static NAT settings
- apply dynamic NAT settings
- apply port Address Translation (PAT) settings
- apply, verify and troubleshoot nat overload

15% - Static Routing:

- apply configuration of specific static routes
- apply summary routes
- apply floating routes
- apply default routes
- understand, interpret, and explain route table analysis

5% - Dynamic Host Configuration Protocol (DHCP):

- apply dhcp version 4
- apply dhcp version 6
- apply stateful and stateless DHCP ACL

5% - Troubleshooting including IP versions 4 and 6:

- troubleshoot configuration using Ping
- troubleshoot configuration using Tracert
- troubleshoot configuration using Ipconfig
- troubleshoot configuration using Sho commands

15% - Access Control Lists (ACL):

- apply appropriate ACL placement, and Virtual Terminal line (VTY) restrictions
- apply Access Control Lists (ACL) including ACL operations
- apply, troubleshoot, and verify standard and extended ACL
- apply named ACL
- apply, troubleshoot, and verify ACLs functionality
- apply and analyze IP Version 6 ACLs

10% - Subnetting Networks:

- configure required Classless Inter Domain Routing (CIDR)
- configure Variable Length Subnet Masks (VLSM) to support segmentation

10% - Routing Protocols:

- configure and verify Distance vector protocols
- configure and verify Next Generation routing protocols
- configure and verify Link State protocols

15% - Inter-Virtual Local Area Network Routing (VLAN):

- configure routing between vlans
- configure layer 3 switching
- configure per interface vlan routing
- configure 802.1q trunking
- configure segmentation
- configure and verify security settings
- apply configuration to create vlans and trunking

5% - Review wireless controllers:

- use packet tracer to manage a group of wireless access points within an enterprise
- use packet tracer to apply wireless security
- use packet tracer wireless configuration

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises
Skills demonstrations

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Classroom Discussion
Objective exams
Projects
Problem-solving exams
Participation
Reports/Papers/Journals
Skills demonstrations

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Computer-aided presentations
Collaborative group work
Class activities
Class discussions
Distance Education
Instructor-guided interpretation and analysis
Instructor-guided use of technology
Laboratory activities
Lecture

Describe specific examples of the methods the instructor will use:

Use of Practice Tracer which is a network simulation tool from Cisco Academy and highly used in Industry. Use of PracticeLabs which is an online equipment rack available 7 X 24. Use of Safari O'reilly Technical Library and LinkedIn Learning for supplemental reinforcement.

Representative Course Assignments

Writing Assignments
- Describe the use of command line for configuring devices.
- Describe newer advancements in routing and switching.
- Describe topics such as virtual local area networks.

Critical Thinking Assignments
- Assess various best practices in configuring network devices.
- Plan and implement an end-to-end network configuration solution using hosts, switches, and routers.
- Design an efficient addressing scheme based upon network requirements.
- Compare and contrast access control list for security enhancement.

Reading Assignments
- Given a network topology, assign internet protocol version 4 and ip version 6 addressing.
- Gain familiarity with various models of router, and switch equipment, read current security configurations and features based on installed security based operating system on router and switch.
- Gain familiarity with subnetting, segmenting, and using vlans to reduce traffic congestion, and increase security on networks.
- Gain familiarity with vendor certification exam preparedness questions.

Skills Demonstrations
- Configure network equipment based on design or lab assignment specifications.
- Troubleshoot to identify or isolate fault domain and get network functional.
- Build collaboration and troubleshooting skills when working as a group to solve networking problems.
- Give a physical topology layout and configure equipment that provides the required networking capabilities.
- Utilize Cisco Packet Tracer simulation tool to configure, test, and submit classroom lab assignments.

Other assignments (if applicable)
- Develop confidence configuring remote equipment using PracticeLabs which is an online equipment rack.
- Prepare for vendor professional certification.

Outside Assignments

Representative Outside Assignments
- Complete assigned exercises on subnetting a network
- Complete reading assignments to strengthen understanding of learning objectives, skills demonstration, command line configuration, troubleshooting, and security controls.
- Prepare for skills demonstration using packet tracer simulation software or remote labs.

Articulation

Comparable Courses within the VCCCD
CNIT R120 - Cisco CCNA Computer Networking I

Equivalent Courses at other CCCs

College	Course ID	Course Title	Units
Cypress College	CIS 230C & 231C	Cisco Networking 1 and 2	3, 3
Fullerton College	CIS 170 F and CIS 172F	Cisco Networking 1 and 2	3, 3

Attach Syllabus
CNSE_M18_Syllabus_Fall_2019_70896_V1.rtf

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

Course is CSU transferable
Yes

CSU Baccalaureate List effective term:
F2003

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type
Textbook

Description
Lammle, Todd. *Cisco CCNA* [Cisco Certified Network Associate] *Certification, 2 Volume Set: Exam 200-301*. Sybex, 2020.

Resource Type
Textbook

Classic Textbook
No

Description
Odom, Wendell. *CCNA* [Cisco Certified Network Associate] *200-301 Official Cert Guide, Volume 1*. Cisco Press, 2020.

Library Resources

Assignments requiring library resources
Research, using the Library's print and online resources, for a paper on network routers and switches.

Sufficient Library Resources exist
Yes

Example of Assignments Requiring Library Resources
Assignments to strengthen understanding of subnetting, internet protocol version 6 which are very challenging due to the need for binary calculations. In particular, the Library's subscription database, O'Reilly Media, provides videos specifically on these and many complicated topics.

Distance Education Addendum

Definitions

Distance Education Modalities

Hybrid (51%–99% online)
Hybrid (51%–99% online) is a temporary emergency approval ONLY
Hybrid (1%–50% online)
Hybrid (1%–50% online) is a temporary emergency approval ONLY
100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

Regular Effective/Substantive Contact

Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Instructor will post a discussion question, students will respond to the question. Students will also respond t other students responses.
E-mail	Instructor will email students with announcements about the course or an upcoming event. Students may email the instructor with their questions or concerns.
Face to Face (by student request; cannot be required)	Students will have the option to meet the instructor and work in the computer lab in the presence of the instructor to get one-on-one help from the instructor.
Other DE (e.g., recorded lectures)	Instructor may record the lectures and post them on Canvas for students to view within a specified time frame.
Synchronous Dialog (e.g., online chat)	Instructor may be available on a certain day or days of the week within a certain time frame to help students and answer their questions via an online chat.
Telephone	Instructor may provide a phone number for the students where they can leave a voicemail and expect a call back within 24 hours.
Video Conferencing	Instructor may be available on a certain day or days of the week within a certain time frame to help students and answer their questions via live video conferencing.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Other DE (e.g., recorded lectures)	Instructor will email students with announcements about the course or an upcoming event. Students in turn may email the instructor with their questions or concerns.
E-mail	Instructor will email students with announcements about the course or an upcoming event. Students in turn may email the instructor with their questions or concerns.
Face to Face (by student request; cannot be required)	Students will have the option to meet the instructor and work in the computer lab in the presence of the instructor to get one-on-one help from the instructor.

Other DE (e.g., recorded lectures)	Instructor may record the lectures and post them for students to view within a specified time frame to be ready for the accompanying assignments. Students will upload their assignment solutions to the course webpage.
Synchronous Dialog (e.g., online chat)	Instructor may be available on a certain day or days of the week within a certain time frame to help students and answer their questions via an online chat.
Video Conferencing	Instructor may be available on a certain day or days of the week within a certain time frame to help students and answer their questions via live video conferencing.
Telephone	Instructor may provide a phone number for the students where they can leave a voicemail and expect a call back within 24 hours.

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Instructor will post a question and students will respond to the question.
E-mail	Instructor will email students with announcements about the course or an upcoming event. Students in turn may email the instructor with their questions or concerns. Students will email their assignments to the instructor.
Face to Face (by student request; cannot be required)	Students will have the option to meet the instructor and work in the computer lab in the presence of the instructor to get one-on-one help from the instructor.
Other DE (e.g., recorded lectures)	Instructor may record the lectures and post them for students to view within a specified time frame to be ready for the accompanying assignments. Students will upload their assignments to the course webpage.
Synchronous Dialog (e.g., online chat)	Instructor may be available on a certain day or days of the week within a certain time frame to help students and answer their questions via an online chat.
Telephone	Instructor may provide a phone number for the students where they can leave a voicemail and expect a call back within 24 hours.
Video Conferencing	Instructor may be available on a certain day or days of the week within a certain time frame to help students and answer their questions via live video conferencing.

Examinations

Hybrid (1%–50% online) Modality
Online
On campus

Hybrid (51%–99% online) Modality
Online
On campus

Primary Minimum Qualification
COMPUTER INFORMATION SYS

Additional local certifications required
A.S. Degree with either Cisco Certification or 6 years of related work experience.

Review and Approval Dates

Department Chair
11/24/2020

Dean
11/24/2020

Technical Review
12/3/2020

Curriculum Committee
1/19/2021

DTRW-I
MM/DD/YYYY

Curriculum Committee
MM/DD/YYYY

Board
MM/DD/YYYY

CCCCO
MM/DD/YYYY

Control Number
CCC000431726

DOE/accreditation approval date
MM/DD/YYYY