

CNSE M19: CISCO SYSTEM COMPUTER NETWORKING B

Originator

egarcia

College

Moorpark College

Discipline (CB01A)

CNSE - Computer Netwrk Sys. Engr. Prg

Course Number (CB01B)

M19

Course Title (CB02)

Cisco System Computer Networking B

Banner/Short Title

Cisco Sys Comp Netwrking B

Credit Type

Credit

Start Term

Fall 2021

Catalog Course Description

Provides intermediate-level instruction on routing and LAN (local area network) switching, VLANs (virtual local area networks), routing protocols, access control lists (ACLs), and network management. Covers WANs (wide area networks), WANs design, point-to-point protocol (PPP), virtual private networking and network management. Covers deployment of a variety of security best practices, and includes automation and programming of network services.

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)

B - Advanced 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

Prerequisites

CNSE M18

Entrance Skills**Entrance Skills**

CNSE M18

Prerequisite Course Objectives

CNSE M18-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).

CNSE M18-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.

CNSE M18-describe VLAN Trunking Protocol, Rapid Spanning Tree, and Per-VLAN Spanning Tree Protocol and 802.1q Protocol.

CNSE M18-enable the IP routing protocols of EIGRP, and OSPF, then configure and troubleshoot static, default, and dynamic routing, including using OSPF routing protocol.

CNSE M18-configure and troubleshoot a small switched network, VLAN, and inter-VLAN routing on layer 3 devices.

CNSE M18-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.

CNSE M18-identify IP address classes, network and node addresses, and subnet masking so as to describe how routers use a layer 3 addressing scheme.

CNSE M18-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.

CNSE M18-describe how the application layer deals with data packets from client-server applications, domain name services, and network applications.
 CNSE M18-describe basic switching concepts, role of VLANs in separate networks and routing between them and apply troubleshooting to resolve issues.
 CNSE M18-describe the correct procedures and commands to access a router, examine and maintain its components, and test its network connectivity.
 CNSE M18-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.
 CNSE M18-describe the difference between routing versus routed protocols and how routers track distance between locations.
 CNSE M18-configure redundancy on a switched network using STP and EtherChannel.
 CNSE M18-describe how to support available and reliable networks using dynamic addressing and first-hop redundancy protocols.

Requisite Justification

Requisite Type

Prerequisite

Requisite

CNSE M18

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Closely related lecture/laboratory course

Student Learning Outcomes (CSLOs)

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

- 1 identify, configure and verify WAN technologies including metro ethernet, vsat, T1/E1, cellular, MPLS, DSL, ISDN, Frame Relay, DSL, Cable, VPN, PPPoE, and PPP.
- 2 perform troubleshooting related to: spanning tree operation, routing processes, OSPF and EIGRP configuration, Vlan routing, and WAN implementations.
- 3 describe IP services as it relates to high availability including VRRP, HSRP, GLBP, syslog configuration, and describe SNMP V2 and V3.
- 4 describe and configure device booting, IOS image management, licensing, and differentiate methods of routing including administrative distance, use of metrics, OSPF multi area, and EIGRP configuration and troubleshooting.
- 5 identify enhanced switching technologies including Spanning Tree types, and root bridge elections.
- 6 configure, verify and troubleshoot a switch with VLANs, and implement Network Address Translation (NAT) and Access Control Lists (ACL).
- 7 describe software defined network, virtualization, and their role in network automation.
- 8 explain how advanced network implement Quality Of Service as a way to prioritize critical traffic.
- 9 configure Internet Protocol Version 4 and Internet Protocol Version 6 static and dynamic routes.

Course Objectives

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

- 1 describe the advantages and disadvantages of using bridges, switches, and routers for LAN segmentation and the effects of switching, bridging, and routing on network throughput.
- 2 compare traditional shared LAN configurations with switched LAN configurations, and discuss the benefits of using a switched virtual local area network (VLAN) architecture.
- 3 describe the OSI Model, LAN design process; and identify network design issues, and network design methodology.
- 4 demonstrate how to use routers to connect two or more networks and how they are used to pass data packets between networks based on network protocol information.
- 5 use standard and extended ACLs (Access Control Lists) as a means to control network traffic and demonstrate how ACLs are used as part of a security solution.
- 6 describe Internet Protocol Versions 4 and 6, their operation and configuration, and addressing requirements.

7	describe the advantages of LAN switching and VLANs along with how they should be implemented.
8	implement a method to control data packet flow across the network for security reasons based on ACLs on the routers.
9	describe the basics of a Wide Area Network (WAN), including common WAN technologies, types of wide-area services, encapsulation formats, and link options.
10	define the basic components, processes, and operations of Point-to-Point Protocol communication.
11	describe WAN Frame Relay services, standards, components, and operation.
12	describe the advantages and disadvantages in both static versus dynamic route configurations.

Course Content

Lecture/Course Content

10% - Configuration - Router and Switch configuration settings:

- router and switch configuration including basic settings
- best practices
- security features and best practices
- gui features
- navigating command line

5% - The OSI Reference Model and Routing:

- application, presentation, session, transport, network, data link, and physical layers

10% - Point-to-Point Protocol (PPP):

- link control protocol
- network control protocol
- encapsulation

10% - Wide Area Networks (WANs) and Virtual Private Networks (VPNs):

- vpn - confidentiality, integrity, and authentication
- vpn clients
- vpn – ipsec
- wan leased-line
- wan circuit-switched
- wan packet-switched

10% - Network Management:

- simple network management protocols – net management station, agent, management information base
- snmp versus rmon
- network time protocol
- logging
- netflow

10% - Internet Protocol Versions 4 and 6:

- address types, unicast, multicast, anycast, broadcast, characteristics, advantages, disadvantages,
- version 4 versus version 6 addressing differences

15% - Access Control Lists:

- syntax, design, direction, placement, wildcard mask, configuration, troubleshooting
- standard
- extended
- named
- ipv4 versus ipv6

15% - Routing Protocols:

- routing information protocol (RIP)
- open shortest path first (OSPF)
- enhanced interior gateway routing protocol (EIGRP) in internet protocol version 4 (IPV4) and internet protocol version 6 (IPV6)
- static routing versus dynamic

10% - LAN Design and network troubleshooting:

- virtual local area networks (VLANs)
- lan switching

- lan trunking
- spanning tree protocol (STP) and troubleshooting

5% - Software Defined Networking:

- virtualization
- automation

Laboratory or Activity Content

Labs supporting lecture topics to be performed using simulator Cisco Packet Tracer, 7 X 24 Remote labs called PracticeLabs, or using routing and switching equipment in campus Cisco lab. A combination of all 3 methods are used for lab instruction.

5% - Switch configuration and troubleshooting

10% - Network Address Translation (NAT)

5% - Dynamic Host Configuration Protocol (DHCP)

10% - ACL configuration and troubleshooting

15% - Network security using routers and switches

10% - PPP configuration and troubleshooting

5% - Wireless enterprise configuration

15% - Inter VLAN configuration, Routing and Trunking

10% - Spanning Tree Protocol (STP) configuration

5% - Network Automation using Software Defined Networking

10% - Dynamic Routing and Static Routing

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
Class activities
Class discussions
Case studies
Distance Education
Group discussions
Instructor-guided use of technology
Laboratory activities
Small group activities

Describe specific examples of the methods the instructor will use:

Use of Packet Tracer network device simulator, Practice labs remote lab, and real cisco equipment are used to explain static and dynamic routes, device configuration options, security features and controls, path selection, and verification of configuration.

Equipment, online accounts, or simulation software is provided to students to connect and configure devices as needed to support network lab assignment as a group to practice participating in collective problem solving.

Submission of configuration statements from labs are used to verify correct configurations have been performed, additionally both PracticeLabs and Cisco Packet Tracer have self grading mechanisms.

Classroom activities include lecture introducing topics followed by lab where students practice configuring equipment, troubleshooting, and verifying successful completion of lab configuration by verifying end to end connectivity.

Representative Course Assignments

Writing Assignments

- Short answer class assignments with specific configuration solutions to VLAN switching scenarios.
- Short answer class assignments such as describing features of different routing protocols.

Critical Thinking Assignments

- Plan and implement a Local and Wide-Area Network addressing design using hosts, switches, and routers that demonstrate competency in implementing access control lists, VLANs, routing protocols, and address translation.
- Plan, implement, and secure Local and Wide-Area Network using hosts, switches, and routers utilizing various protocols.

Reading Assignments

- Review a Cisco Packet Tracer assigned Lab documentation and prepare to configure the components and device configurations as needed including researching the necessary configuration and troubleshooting commands and expected device outputs.
- Read Cisco Academy content in preparation to configure equipment to support lab requirements
- Review Cisco.com and other professional network online sites used by professionals to better understand technical concepts and technologies used in the networking field

Skills Demonstrations

- Troubleshoot equipment to solve networking problems and challenges.
- Configure equipment using commands to satisfy lab requirements.
- Connect equipment using physical wiring specifications to satisfy lab requirements.
- Communicate effectively as both a team member and a team leader to coordinate and implement a lab scenario.

Outside Assignments

Representative Outside Assignments

- Assigned readings that explain routing and switching configurations and explain the benefits of those configurations.
- Assigned readings from text and other sources on new routing and switching advancements.
- Assigned simulation configuration scenarios from text that address routing and switching configuration.
- Field observations of best practices of network administration.

Articulation

Comparable Courses within the VCCCD

CNIT R121 - Cisco CCNA Computer Networking II

Equivalent Courses at other CCCs

College	Course ID	Course Title	Units
Cypress College	CIS 232C and 233C	Cisco Networking 3 and 4	3, 3
Fullerton College	CIS 173 F and 174 F	Cisco Networking 3 and 4	3, 3

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

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 papers on topics appropriate to the course.

Sufficient Library Resources exist

Yes

Example of Assignments Requiring Library Resources

Research for a paper on such topics as routing protocols, switching methods, network security, or configuration best practices.

Distance Education Addendum

Definitions

Distance Education Modalities

Hybrid (51%–99% online)
 Hybrid (1%–50% online)
 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 question or an erroneous code, students will respond to the question or attempt to analyze the code and suggest how to debug the code.
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 programs and projects 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 programming assignments. Students will upload their programs and projects 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.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
E-mail	Same as 100% online but done in front of a classroom with supportive explanation. Packet Tracer home assignments.
Face to Face (by student request; cannot be required)	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 programs and projects to 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 programming assignments.
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.
Asynchronous Dialog (e.g., discussion board)	Instructor will post a question or an erroneous code, students will respond to the question or attempt to analyze the code and suggest how to debug the code.

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 or an erroneous code, students will respond to the question or attempt to analyze the code and suggest how to debug the code.
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 programs and projects 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 programming assignments.
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Telephone	Instructor may provide a phone number for the students where they can leave a voicemail and expect a call back within 24 hours.

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

CCC000428303

DOE/accreditation approval date

MM/DD/YYYY