

**CS 82.22C Course Outline as of Fall 2021****CATALOG INFORMATION**

Dept and Nbr: CS 82.22C Title: ENT NET SEC

Full Title: Enterprise Networking, Security, and Automation

Last Reviewed: 2/22/2021

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	4.00	Lab Scheduled	0	8	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00

Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

This third and final course in the Cisco Certified Network Associate (CCNA) series describes the architecture, components, operations, and security to scale for large, complex networks, including Wide Area Network (WAN) technologies. The course emphasizes network security concepts and introduces network virtualization and automation. Students learn how to configure, troubleshoot, and secure enterprise network devices and understand how Application Programming Interfaces (API) and configuration management tools enable network automation.

**Prerequisites/Corequisites:**

Course Completion of CS 82.2B ( or CS 82.22B)

**Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100 or appropriate placement based on AB705 mandates

**Limits on Enrollment:****Schedule of Classes Information:**

Description: This third and final course in the Cisco Certified Network Associate (CCNA) series describes the architecture, components, operations, and security to scale for large, complex networks, including Wide Area Network (WAN) technologies. The course emphasizes network

security concepts and introduces network virtualization and automation. Students learn how to configure, troubleshoot, and secure enterprise network devices and understand how Application Programming Interfaces (API) and configuration management tools enable network automation. (Grade or P/NP)

Prerequisites/Corequisites: Course Completion of CS 82.2B ( or CS 82.22B)

Recommended: Eligibility for ENGL 100 or ESL 100 or appropriate placement based on AB705 mandates

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective: Fall 2021	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

**CID:**

**Certificate/Major Applicable:**

Not Certificate/Major Applicable

## **Approval and Dates**

Version:	01	Course Created/Approved:	2/22/2021
Version Created:	11/28/2020	Course Last Modified:	4/13/2022
Submitter:	Michael McKeever	Course last full review:	2/22/2021
Version Status:	Approved New Course (First Version)	Prereq Created/Approved:	2/22/2021
Version Status Date:	2/22/2021	Semester Last Taught:	
Version Term Effective:	Fall 2021	Term Inactive:	Fall 2022

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Configure, troubleshoot, and secure enterprise network devices
2. Differentiate application programming interfaces (APIs) and the configuration management tools that make network automation possible.

### **Objectives:**

Students will be able to:

1. Configure single-area Open Shortest Path First (OSPFv2) in both point-to-point and multiaccess networks.
2. Explain how to mitigate threats and enhance network security using access control lists and security best practices.

3. Implement standard IPv4 Access Control Lists (ACLs) to filter traffic and secure administrative access.
4. Configure Network Address Translation (NAT) services on the edge router to provide IPv4 address scalability.
5. Explain techniques to provide address scalability and secure remote access (such as Virtual Private Network (VPN) and Internet Protocol Security (IPSec)) for Wide Area Networks (WANs).
6. Explain how to optimize, monitor, and troubleshoot scalable network architectures.
7. Explain how networking devices implement Quality of Service (QoS).
8. Implement protocols to manage the network.
9. Explain how technologies such as virtualization, software defined networking, and automation affect evolving networks.

### **Topics and Scope:**

- I. Single-Area OSPFv2 Concepts
- II. Single-Area OSPFv2 Configuration
- III. Network Security Concepts
- IV. ACL Concepts and Configuration
- V. NAT for IPv4
- VI. WAN Concepts
- VII. Virtual Private Network (VPN) and Internet Protocol Security (IPSec) Concepts
- VIII. QoS Concepts
- IX. Network Management
- X. Network Design
- XI. Network Troubleshooting
- XII. Network Virtualization
- XIII. Network Automation

### **Assignment:**

Reading assignments include:

1. Online research of security devices and deployment practices
2. Approximately 50 pages weekly from the textbook

Homework problems include:

1. Weekly online discussion thread participation
2. Hands-on exercises and class performances to demonstrate proficiency with topics
3. Online quizzes
4. Creation of security design diagrams and layouts

Other assignments include:

1. Quizzes (9 - 11) and skill demonstration exam
2. Classroom scenario-based exercises

### **Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Weekly written online discussions	Writing 5 - 10%
<b>Problem Solving:</b> Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.	
Homework problems, Creation of network, operating system and security design diagrams and layouts	Problem solving 15 - 30%
<b>Skill Demonstrations:</b> All skill-based and physical demonstrations used for assessment purposes including skill performance exams.	
Skill demonstration exam	Skill Demonstrations 20 - 30%
<b>Exams:</b> All forms of formal testing, other than skill performance exams.	
Quizzes and skill demonstration exam	Exams 20 - 30%
<b>Other:</b> Includes any assessment tools that do not logically fit into the above categories.	
Attendance and participation in scenario based exercises	Other Category 5 - 20%

### **Representative Textbooks and Materials:**

Enterprise Networking, Security, and Automation Companion Guide (CCNAv7). Cisco Networking Academy. Cisco Press. 2020

Enterprise Networking, Security, and Automation Course Booklet (CCNAv7). Cisco Networking Academy. Cisco Press. 2020

## **OTHER REQUIRED ELEMENTS**

### **STUDENT PREPARATION**

Matric Assessment Required:	E	Requires English Assessment
Prerequisites-generate description:	A	Auto-Generated Text
Advisories-generate description:	A	Auto-Generated Text
Prereq-provisional:	N	NO
Prereq/coreq-registration check:	Y	Prerequisite Rules Exist
Requires instructor signature:	N	Instructor's Signature Not Required

### **BASIC INFORMATION, HOURS/UNITS & REPEATABILITY**

Method of instruction:	02	Lecture
	71	Internet-Based, Simultaneous Interaction
	72	Internet-Based, Delayed Interaction
Area department:	CS	Computer Studies
Division:	72	Arts & Humanities
Special topic course:	N	Not a Special Topic Course
Program status:	2	Not Certificate/Major Applicable
Repeatability:	00	Two Repeats if Grade was D, F, NC, or NP
Repeat group id:		CS 8221C-8222C

### **SCHEDULING**

Audit allowed:	N	Not Auditable
Open entry/exit:	N	Not Open Entry/Open Exit
Credit by exam:	N	Credit by examination not allowed
Budget code: Program:	0000	Unrestricted
Budget code: Activity:	0701	Computer & Information Science

### **OTHER CODES**

Discipline:	Computer Information Systems	
Basic skills:	N	Not a Basic Skills Course
Level below transfer:	Y	Not Applicable
CVU/CVC status:	Y	Distance Ed, Not CVU/CVC Developed
Distance Ed Approved:	Y	Either online or hybrid, as determined by instructor
Emergency Distance Ed Approved:	N	None
Credit for Prior Learning:	N	Agency Exam
	N	CBE
	N	Industry Credentials
	N	Portfolio
Non-credit category:	Y	Not Applicable, Credit Course
Classification:	Y	Career-Technical Education
SAM classification:	C	Clearly Occupational
TOP code:	0708.00	Computer Infrastructure and Support
Work-based learning:	N	Does Not Include Work-Based Learning
DSPS course:	N	Not a DSPS Course
In-service:	N	Not an in-Service Course