

**I. CATALOG INFORMATION**A. Discipline: COMPUTER NETWORKING SYSTEMS ENGINEERING (CNSE)B. Subject Code and Number: CNSE M85AC. Course Title: Cybersecurity of IOS Networks

D. Credit Course units:

Units: 3Lecture Hours per week: 2Lab Hours per week : 3Variable Units : No

E. Student Learning Hours:

Lecture Hours:

Classroom hours: 35 - 35

Laboratory/Activity Hours:

Laboratory/Activity Hours 52.5 - 52.5**Total Combined Hours** in a 17.5 week term: 87.5 - 87.5

F. Non-Credit Course hours per week \_\_\_\_\_

G. May be taken a total of:  1  2  3  4 time(s) for creditH. Is the course co-designated (same as) another course: No  Yes 

If YES, designate course Subject Code &amp; Number: \_\_\_\_\_

I. Course Description:

Focuses on cybersecurity processes and policy with an emphasis on router, switch and firewall hands-on skills. Covers router and switch security, firewall implementation, Access Control Lists (ACLs), Authentication, Authorization, Accounting (AAA), intrusion detection, monitoring, and management, and Virtual Private Network (VPN) implementation.

J. Entrance Skills

\*Prerequisite: No  Yes  Course(s)

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\*Corequisite: No  Yes  Course(s)

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Limitation on Enrollment: No  Yes 

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Recommended Preparation: No  Yes  Course(s)

CNSE M18 or Completion of ENGT R120 at Oxnard College or Work experience configuring Cisco equipment.

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Other: No  Yes

K. Other Catalog Information:

Covers the first half of the Cisco Network Security Curriculum. Prepare students for Securing Cisco IOS Networks exam (Exam #210-260).

## II. COURSE OBJECTIVES

Upon successful completion of the course, a student will be able to:

|   |   | <b>Methods of evaluation will be consistent with, but not limited by, the following types or examples.</b> |
|---|---|--|
| 1 | identify the potential threats to an enterprise network and explain the three primary reasons for network security vulnerabilities.                             | Quizzes, midterms, and final exam; Classroom project work demonstrating competency in this area.           |
| 2 | describe general router and switch security.  | Quizzes, midterms, and final exam; Classroom project work demonstrating competency in this area.           |
| 3 | describe the process of implementing and using Cisco Configuration Professional Graphic User Interface (GUI) tool as it pertains to securing Routers, Switches. | Quizzes, midterms, and final exam; Classroom project work demonstrating competency in this area.           |
| 4 | describe types of Internet Protocol (IP) Access Control Lists.  | Quizzes, midterms, and final exam; Classroom project work demonstrating competency in this area.           |
| 5 | define Authentication, Authorization, Accounting (AAA) architecture.  | Quizzes, midterms, and final exam; Classroom project work demonstrating competency in this area.           |
| 6 | set up the Cisco Internetwork Operating System (IOS) Firewall Intruder Detection System (IDS).  | Quizzes, midterms, and final exam; Classroom project work demonstrating competency in this area.           |
| 7 | explain the Virtual Private Networking (VPN) protocols available in Cisco Internetwork Operating System (IOS) routers.  | Quizzes, midterms, and final exam; Classroom project work demonstrating competency in this area.           |

|   |  |  |
|---|--|--|
| 8 | describe the basics of Remote Access Virtual Private Networking (VPN). | Quizzes, midterms, and final exam; Classroom project work demonstrating competency in this area. |
|---|--|--|

### III. COURSE CONTENT

| Estimated %                      | Topic   | Learning Outcomes      |
|----------------------------------|---|------------------------|
| <b>Lecture</b> (must total 100%) |   |                        |
| 14.00%                           | Basic Router and Switch Security  | 2, 3                   |
| 14.00%                           | Router Intrusion Detection, Monitoring and Management   | 2, 3, 6                |
| 14.00%                           | Router Site-to-Site VPN (Virtual Private Network)   | 7, 8                   |
| 10.00%                           | Overview of Network Security  | 1, 2                   |
| 12.00%                           | Router ACLs (Access Control Lists)  | 4                      |
| 12.00%                           | Router AAA (Authentication, Authorization, Accounting) Security   | 5                      |
| 12.00%                           | Router Remote Access VPN  | 7, 8                   |
| 12.00%                           | Use of Cisco Configuration Professional in Securing Routers, Switches, and Firewalls  | 1, 2, 3, 4, 5, 6, 7, 8 |
| <b>Lab</b> (must total 100%)     |   |                        |
| 10.00%                           | Use Cisco Configuration Professional (CCP) to configure firewalls, routers, switches  | 1, 2, 3, 4, 5, 6, 7, 8 |
| 10.00%                           | Implement Authentication, Authorization, Accounting (AAA) using Internetwork Operating System (IOS) and the Access Control Server (ACS) | 3, 5                   |
| 10.00%                           | Secure layer 2 technologies   | 3                      |
| 10.00%                           | Use Access Control Lists (ACL) for threat mitigation  | 4                      |
| 10.00%                           | Implement Cisco Internetwork Operating System Zone-Based firewalls  | 3, 4, 5, 6, 7, 8       |
| 10.00%                           | Configure security policies   | 1, 2, 3, 4, 6          |
| 10.00%                           | Implement Internetwork Operating System-Based Intruder Protection Systems (IPS)   | 6                      |
| 10.00%                           | Use Adaptive Security /Device Manager (ASDM) to manage Cisco firewalls  | 2, 3, 5                |
| 20.00%                           | Implement Site to Site Virtual Private Networks   | 7, 8                   |

### IV. TYPICAL ASSIGNMENTS

#### A. Writing assignments

|   |   |
|---|---|
| Writing assignments are required. Possible assignments may include, but are not limited to: |   |
| 1   | document procedures for security policies.  |
| 2   | document configuration procedures related to Virtual Private Networking including troubleshooting and verifying connectivity. |
| 3   | short answer class assignments.   |

**B. Appropriate outside assignments**

|   |   |
|---|---|
| Appropriate outside assignments are required. Possible assignments may include, but are not limited to: |   |
| 1   | assigned readings from text and other sources.  |
| 2   | assigned writings on configuring and troubleshooting Virtual Private Network systems. |
| 3   | field observations of network administration.   |
| 4   | assigned simulation from text.  |

**C. Critical thinking assignments**

|   |  |
|---|--|
| Critical thinking assignments are required. Possible assignments may include, but are not limited to: |  |
| 1   | discuss lab solutions with lab partners that demonstrate problem solving skills.   |
| 2   | solve lab scenarios to meet business requirements, such as securing a given network topology using firewalls, switches, and routers. |

**V. METHODS OF INSTRUCTION**

Methods of instruction may include, but are not limited to:

- Distance Education – When any portion of class contact hours is replaced by distance education delivery mode (Complete DE Addendum, Section XV)
- Lecture/Discussion
- Laboratory/Activity
- Other (Specify)  
 Online materials, assigned Internet research, and use of Packet Tracer for network simulations. Note: Packet Tracer is a free windows application tool provided to Moorpark's Cisco Academy to facilitate learning. To be used at home and in classroom.

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- Optional Field Trips
- Required Field Trips

**VI. METHODS OF EVALUATION**

Methods of evaluation may include, but are not limited to:

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Essay Exam                      | <input checked="" type="checkbox"/> Classroom Discussion    | <input checked="" type="checkbox"/> Skill Demonstration |
| <input checked="" type="checkbox"/> Problem Solving Exam | <input checked="" type="checkbox"/> Reports/Papers/Journals | <input checked="" type="checkbox"/> Participation       |
| <input checked="" type="checkbox"/> Objective Exams      | <input checked="" type="checkbox"/> Projects                | <input checked="" type="checkbox"/> Other (specify)     |

Assess troubleshooting skills in a lab environment.

**VII. REPRESENTATIVE TEXTS AND OTHER COURSE MATERIALS**

Santos, Omar, and John Stuppi. CCNA Security 210-260 Official Cert Guide. Cisco, 2015.

Cisco Networking Academy Program. CCNA Security Course Booklet Version 1.2. 3rd ed. Cisco, 2014.

### VIII. STUDENT MATERIALS FEES

No  Yes

### IX. PARALLEL COURSES

| College                     | Course Number | Course Title                   | Units |
|-----------------------------|---------------|--------------------------------|-------|
| Santa Barbara City College  | CNEE 145      | Cisco IOS Network Security     | 3     |
| Ohlone College              | CNET 172      | CCNA Security                  | 2     |
| Coastline Community College | C S T C237    | Cisco ASA and Network Security | 1.5   |

### X. MINIMUM QUALIFICATIONS

**Courses in Disciplines in which Masters Degrees are not expected:**

Associate Degree in Applied Technology, Computer Networking, or Engineering + 6 years networking experience + CCNA certification.

### XI. ARTICULATION INFORMATION

A. Title V Course Classification:

1. This course is designed to be taken either:

Pass/No Pass only (no letter grade possible); or

Letter grade (P/NP possible at student option)

2. Degree status:

Either  Associate Degree Applicable; or  Non-associate Degree Applicable

B. Moorpark College General Education:

1. Do you recommend this course for inclusion on the Associate Degree General Education list?

Yes:  No:  If YES, what section(s)?

A1 - Natural Sciences - Biological Science

A2 - Natural Sciences - Physical Science

B1 - Social and Behavioral Sciences - American History/Institutions

B2 - Social and Behavioral Sciences - Other Social Behavioral Science

C1 - Humanities - Fine or Performing Arts

C2 - Humanities - Other Humanities

D1 - Language and Rationality - English Composition

D2 - Language and Rationality - Communication and Analytical Thinking

E1 - Health/Physical Education

E2 - PE or Dance

F - Ethnic/Gender Studies

C. California State University(CSU) Articulation:

1. Do you recommend this course for transfer credit to CSU? Yes:  No:
2. If YES do you recommend this course for inclusion on the CSU General Education list?  
 Yes:  No:  If YES, which area(s)?  
 A1  A2  A3  B1  B2  B3  B4   
 C1  C2  D1  D2  D3  D4  D5   
 D6  D7  D8  D9  D10  E

D. University of California (UC) Articulation:

1. Do you recommend this course for transfer to the UC? Yes:  No:
2. If YES do you recommend this course for the Intersegmental General Education Transfer Curriculum (IGETC)? Yes:  No:

IGETC Area 1: English Communication

- English Composition
- Critical Thinking-English Composition
- Oral Communication

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

- Mathematical Concepts

IGETC Area 3: Arts and Humanities

- Arts
- Humanities

IGETC Area 4: Social and Behavioral Sciences

- Anthropology and Archaeology
- Economics
- Ethnic Studies
- Gender Studies
- Geography
- History
- Interdisciplinary, Social & Behavioral Sciences
- Political Science, Government & Legal Institutions
- Psychology
- Sociology & Criminology

IGETC Area 5: Physical and Biological Sciences (mark all that apply)

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- Physical Science Lab or Physical Science Lab only (non-sequence)
- Physical Science Lecture only (non-sequence)
- Biological Science
- Physical Science Courses
- Physical Science Lab or Biological Science Lab Only (non-sequence)
- Biological Science Courses
- Biological Science Lab course
- First Science course in a Special sequence
- Second Science course in a Special Sequence
- Laboratory Activity
- Physical Sciences

IGETC Area 6: Language other than English

- Languages other than English (UC Requirement Only)
- U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)
- U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)

**XII. REVIEW OF LIBRARY RESOURCES**

- A. What planned assignment(s) will require library resources and use?

The following assignments require library resources:

Research, using the Library's print and online resources to understand security settings of routers, switches, and firewalls.

- B. Are the currently held library resources sufficient to support the course assignment?

YES:  NO:

If NO, please list additional library resources needed to support this course.

**XIII. PREREQUISITE AND/OR COREQUISITE JUSTIFICATION**

CNSE M85A: Not Applicable

**XIV. WORKPLACE PREPARATION**

Required for career technical courses only. A career technical course/program is one with the primary goal to prepare students for employment immediately upon course/program completion, and/or upgrading employment skills.

Detail how the course meets the Secretary of Labors Commission on the Achievement of Necessary Skills (SCANS) areas. (For a description of the competencies and skills with a listing of what students should be able to do, go to:

<http://www.ncrel.org/sdrs/areas/issues/methods/assment/as7scans.htm>)

The course will address the SCANS competency areas:

1. Resources: the students will identify, organize, plan and allocate resources

through course work and application of theory to practice.

2. Interpersonal: the students will work together as a team to build network configuration projects and solve technical problem scenarios.
3. Information: the students will acquire and use information through a variety of assignments, network technology tools, and computer software used in computer network systems; for example, use Cisco Configuration Professional and other Cisco networking tools to effectively configure equipment.
4. Systems: the students will employ a variety of computer tools to complete projects or assess networking problems.
5. Technology: the students will use modern technology to acquire the skills needed to prepare for a career.

The course also addresses the SCANS skills and personal qualities:

1. Basic Skills: the students will read, perform configuration operations, listen and speak for weekly assignments and participate in classroom discussions.
2. Thinking Skills: the students will think creatively and make decisions in order to solve network configuration problems and demonstrate reasonable problem solving skills.
3. Personal Qualities: the students will be required to display responsibility, self-management, integrity, and honesty throughout course work and classroom exercises.

**XV. DISTANCE LEARNING COURSE OUTLINE ADDENDUM**

CNSE M85A: Not Applicable

**XVI. GENERAL EDUCATION COURSE OUTLINE ADDENDUM**

CNSE M85A: Not Applicable

**XVII. STUDENT MATERIALS FEE ADDENDUM**

CNSE M85A: Not Applicable

**XVIII. REPEATABILITY JUSTIFICATION TITLE 5, SECTION 55041**

CNSE M85A: Not Applicable

**XIX. CURRICULUM APPROVAL**

Course Information:

Discipline:

COMPUTER NETWORKING SYSTEMS ENGINEERING (CNSE)

Discipline Code and Number: CNSE M85A

Course Revision Category: Outline Update

Course Proposed By:

Originating Faculty Edmond Garcia 09/11/2015

Faculty Peer: Edmond Garcia 09/12/2015

Curriculum Rep: \_\_\_\_\_



Department Chair: Navreet Sumal 09/13/2015

Division Dean: Jennifer Goetz 09/26/2015

Approved By:

Curriculum Chair: Jerry Mansfield 11/29/2015

Executive Vice President: Lori Bennett 10/21/2015

Articulation Officer: Letrisha Mai 10/01/2015

Librarian: Mary LaBarge 10/01/2015

Implementation Term and Year: Fall 2016

Approval Dates:

Approved by Moorpark College Curriculum Committee: 10/06/2015

Approved by Board of Trustees (if applicable): \_\_\_\_\_

Approved by State (if applicable): 02/03/2016