

# CNSE M57: SCRIPTING FOR SECURITY MANAGEMENT

**Originator**

egarcia

**Co-Contributor(s)**
**Name(s)**

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**College**

Moorpark College

**Attach Support Documentation (as needed)**

CNSE\_M57\_COE\_Update\_Justification.docx

**Discipline (CB01A)**

CNSE - Computer Netwrk Sys. Engr. Prg

**Course Number (CB01B)**

M57

**Course Title (CB02)**

Scripting for Security Management

**Banner/Short Title**

Scripting for Security Mngt.

**Credit Type**

Credit

**Start Term**

Fall 2021

**Catalog Course Description**

Examines creating and modifying scripts for communications with security and network based applications. Covers scripting using Python, BASH, and Powershell for system administration, web interaction, network and host security and penetration testing. Provides knowledge and hands-on experience applying various programming concepts while using security tools.

**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**

(L) Letter Graded

**Alternate grading methods**

(O) Student Option- Letter/Pass

(P) 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**

52.5

**Total in-Class**

**Total in-Class**

**Total Minimum Contact/In-Class Hours**

87.5

**Total Maximum Contact/In-Class Hours**

87.5

**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**

157.5

**Total Maximum Student Learning Hours**

157.5

**Minimum Units (CB07)**

3

**Maximum Units (CB06)**

3

**Advisories on Recommended Preparation**

CNSE M55

**Requisite Justification**

**Requisite Type**

Advisory

**Requisite**

Student should be able to run Virtualization software using VMWare Workstation, Virtual Box, or Fusion (MAC) as programming assignments will running Python and other scripting languages. Students will run Kali Linux and Metasploit as Virtual Machines.

**Level of Scrutiny/Justification**

Required communication/computation skill

**Student Learning Outcomes (CSLOs)**

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

- |   |                                                                                                                           |
|---|---------------------------------------------------------------------------------------------------------------------------|
| 1 | configure Python scripts that use various interprocess communication concepts.                                            |
| 2 | select and analyze the different tools and techniques related to network sockets and create Python scripts that use them. |

- |   |                                                                                                                                                                      |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | modify Python applications to send and receive interactions with security tools such as Kali Linux and to perform system automation and system administration tasks. |
| 4 | create well written Python scripts using good programming techniques for security administration and to automate system administration tasks.                        |

### Course Objectives

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

- |    |                                                                                                                                                                                        |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | create Python scripts that use various control structures including loops, comparisons, conditions, lists, functions, modules, and various data types and perform string manipulation. |
| 2  | use Python scripts that select and analyze the different security tools and techniques related to network security.                                                                    |
| 3  | create and modify Python penetration scripts that interact with the transmission control protocol.                                                                                     |
| 4  | create Python scripts that interact with the network and perform security administration.                                                                                              |
| 5  | use the various repositories to obtain and install Python modules and additional Python language features or extensions.                                                               |
| 6  | create Python scripts to send and receive communication information.                                                                                                                   |
| 7  | create application interactions with Python.                                                                                                                                           |
| 8  | utilize both Windows and Unix platforms when using Python and other scripting languages.                                                                                               |
| 9  | create well-written Python scripts using good programming techniques including documentation, logic, and debugging techniques.                                                         |
| 10 | demonstrate proficiency in use of scripting languages to write simple scripts related to security, automation, and system administration.                                              |
| 11 | demonstrate proficiency in writing simple linear, looping, conditional, and compound scripts.                                                                                          |
| 12 | demonstrate proficiency in use of scripting language to solve complex problems using security tools that address automation or system administration.                                  |
| 13 | demonstrate a fundamental understanding of multiple scripting languages including Python, Bash, and Microsoft Powershell.                                                              |

### Course Content

#### Lecture/Course Content

##### 15% - Scripting Languages

- Configure Python in Windows and Unix platforms
- Windows and Linux commands
- Configure Bash in Linux and Powershell in Microsoft Windows
- Comparing use of Python, Bash, and Powershell
- Review of online resources to support effective use of scripting languages

##### 20% - System Security Administration and Automation

- Setting up programming environments and tools
- Security scripts, tools, and techniques
- Kali Linux security tools and Python
- Kali Linux Metasploit
- System Administration tasks overview
- Vulnerability Analysis

##### 20% - Scripting and security basics

- Logic and operations
- Input validation
- Permissions
- Bounds checking
- Parameter validation

##### 25% - Scripting constructs

- Variables and data types
- Boolean logic
- strings, arrays, and other structures
- Linear and conditional flows using if, else

- Loops using for, while
- Functions, procedures, calls

#### 10% - Security Scripting

- Hashes and passwords
- Encryption
- Information gathering
- Sql mapping

#### 10% - Debugging

- Checking and verifying logic, syntax, and code
- Using debugging tools and techniques
- Using exit and exception handling

### Laboratory or Activity Content

#### 15% - Scripting Environment

- Install Kali Linux, and Metasploit
- Install Python, BASH, and Powershell
- Install 3rd party security, and system administration scripts

#### 75% - Scripting/Programming

- Develop a basic understanding of programming concepts using Python for controlling logic flow
- Retrieve information from the network
- Manipulate output, and storing results in files
- Explore Variables, data types, Boolean logic
- Manipulate strings, arrays, and other structures
- Build Linear and conditional flows using if, else
- Use Loops using for, while, if, else
- Create functions, procedures, calls
- Use debugger to identify and validate program syntax and logic

#### 10% - Security and System Administration/Automation

- Modify Python security scripts based on security auditing tasks
- Enhance or customize scripts to perform security and system administration tasks
- Use existing 3rd party Python penetration testing scripts to collect network and computer forensics data

## 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  
Computational homework  
Group projects  
Individual projects  
Laboratory activities  
Oral analysis/critiques  
Objective exams  
Oral presentations  
Projects  
Problem-solving exams  
Participation  
Quizzes  
Reports/papers  
Skills demonstrations  
Skill tests or practical examinations  
Simulations  
Written analyses  
Written homework

## Instructional Methodology

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

Audio-visual presentations  
 Computer-aided presentations  
 Collaborative group work  
 Class activities  
 Class discussions  
 Case studies  
 Distance Education  
 Demonstrations  
 Group discussions  
 Instructor-guided interpretation and analysis  
 Instructor-guided use of technology  
 Internet research  
 Laboratory activities  
 Lecture  
 Small group activities  
 Web-based presentations

### Describe specific examples of the methods the instructor will use:

Instructor will integrate a learning management system, e.g., Canvas, for supplemental support such as providing lab supplemental materials and whitepapers.

Lab: Instructor will provide instructions on lab exercises along with screen prints explaining detailed steps. Labs will include instructor's comments and observations for students to note while completing labs. Students will be expected to complete labs and solve programming assignments and be able to explain programming logic, syntax, and program design. Students will submit labs that are scored online and submit completion scores as evidence of completion using a learning management system (LMS), for example, Canvas. Labs will include using a virtualized environment to support Ubuntu Linux systems, Kali Linux, Metasploit security tools. Students will develop programming skills that use Python, BASH, and Powershell in hands-On activities to query network systems. Emphasis is in learning to build and customize programs for network security administration as performed by professional security administrators.

## Representative Course Assignments

### Writing Assignments

1. Programming exercises. An example would be using Python programming to perform various network auditing such as enumerating a network, or collecting operating system profiles.
2. Programming logic assignment. An example would be writing coding logic that uses "for" loops and another assignment using "do while" iteration loops.
3. Programming summation assignment. An example would be writing basic Python code that can summarize data by iterating through a logic loop and storing results into a file.
4. Programming languages comparison. An example would be writing a script that performs the same security administration tasks using Python and either BASH or Powershell or another scripting language.

### Critical Thinking Assignments

1. Use Python to compare and contrast various Python security administration programming techniques.
2. Design a Python program that will require the use of various control structures, iterations, and string manipulations.
3. Apply scripting techniques that utilize best practices in securing and auditing networks.
4. Design scripting solutions that use penetration testing and security administration techniques to perform security audits.
5. Research and apply newly imported modules that will extend your Python programming capabilities for a course programming project.
6. Apply debugging techniques that verify scripting code and logic that identifies normal and abnormal situations.

### Reading Assignments

1. Review and explain the benefits of various Linux utilities that help with system administration or improve security and how they can be accomplished using scripting languages.
2. Review in depth a specific Linux program or tool and how it improves system functionality, or solves a technical or business problem.
3. Review online scripts and provide a short explanation of the application of this script in performing security administration.
4. Review prominent Python and Linux scripts that help with system administration and Security Best Practices.

**Skills Demonstrations**

1. Demonstrate use of Kali Linux and Metasploit security tools and explain the various security features.
2. Demonstrate using scripts to automate security administration processes.
3. Configure scripting languages to perform either automation or security requirements.
4. Apply Security Best Practices using scripting languages.

**Other assignments (if applicable)**

1. Utilize scripting and security solutions that provide students with additional knowledge and practice of the common day-to-day tasks of a Linux administrator.
2. Conduct field observations via online videos of network administration roles. For example, review interning, job shadowing, security job roles, or penetration testing to provide additional details to the day-to-day tasks of a system security administrator.
3. Read assigned topics from the textbook and other sources such as books, periodicals, as well as informational and company websites that focus on system security administration.

**Outside Assignments****Representative Outside Assignments**

1. Assigned readings that explain the various programming options in collecting network information and explain the application of those solutions.
2. Short scripting programming assignments that reinforce the benefits of using programming to perform system security administration.
3. Review and report on short videos such "Automate the Boring Stuff - using Python" to see industry experts explaining the use of Python to perform scripting.

**Articulation****Equivalent Courses at other CCCs**

College	Course ID	Course Title	Units
Coastline Community College	CST C258	Linux Networking and Security	3
Santa Monica College	CS 87A	Python Programming	3
Glendale College	CS/IS 151	Python Programming	3
City College San Francisco	CS 160B	Unix/Linux Shell Scripting	2

**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:**

S2003

## 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

Rehim, Rejah. *Python Penetration Testing Cookbook: Practical recipes on implementing information gathering, network security, intrusion detection, and post-exploitation*. Packt Publishing, 2017.

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### Resource Type

Textbook

### Description

Duffy, Christopher. *Learning Penetration Testing with Python*. Packt Publishing, 2015.

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### Resource Type

Textbook

### Description

Sweigart, Al. *Automate the Boring Stuff with Python: Practical Programming for Total Beginners*. 2nd ed., No Starch Press, 2019.

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### Resource Type

Textbook

### Classic Textbook

Yes



**Description**

O'Connor T.J. Violent Python: a Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers. Elsevier Inc., 2013.

**Library Resources**

**Assignments requiring library resources**

Research using the Library's print and online resources (specifically the Safari O'Reilly database) for written assignments on appropriate topics. Use of Safari O'Reilly Technical Subscription Library will be a great benefit to this and most CNSE courses.

**Sufficient Library Resources exist**

Yes

**Example of Assignments Requiring Library Resources**

Utilize library resources to prepare oral presentations on current programming issues as well as current events related to the computer programming or computer security industry.

**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 discussion question, students will respond to the question. Students will also respond to 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.
<b>Hybrid (51%–99% online) Modality:</b>	
<b>Method of Instruction</b>	<b>Document typical activities or assignments for each method of instruction</b>
Asynchronous Dialog (e.g., discussion board)	Instructor will post a discussion question, students will respond to the question. Students will also respond to other students' responses.
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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.
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.
<b>100% online Modality:</b>	
<b>Method of Instruction</b>	<b>Document typical activities or assignments for each method of instruction</b>
Asynchronous Dialog (e.g., discussion board)	Instructor will post a discussion question, students will respond to the question. Students will also respond to 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.
<b>Examinations</b>	
<b>Hybrid (1%–50% online) Modality</b>	
Online	
On campus	
<b>Hybrid (51%–99% online) Modality</b>	
Online	
On campus	

**Primary Minimum Qualification**

COMPUTER INFORMATION SYS

**Additional local certifications required**

7+ years of Info Technology experience and working knowledge of Linux.

**Review and Approval Dates****Department Chair**

02/08/2021

**Dean**

02/08/2021

**Technical Review**

03/04/2021

**Curriculum Committee**

3/16/2021

**DTRW-I**

04/08/2021

**Curriculum Committee**

MM/DD/YYYY

**Board**

05/11/2021

**CCCCO**

MM/DD/YYYY

**Control Number**

CCC000602404

**DOE/accreditation approval date**

MM/DD/YYYY