

**CS 181.43 Course Outline as of Fall 2022****CATALOG INFORMATION**

Dept and Nbr: CS 181.43 Title: CYBER PROGRAMMING

Full Title: Programming for Cyber Security

Last Reviewed: 5/10/2021

Units	Course Hours per Week		Nbr of Weeks		Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	8	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

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 course offers an in-depth introduction to programming/scripting languages for system administration, web application auditing, cybersecurity and penetration testing. It provides an overview of modern scripting languages commonly used to build and extend security tools. The course will introduce students to scripting on both the Microsoft and Linux platforms and will include an overview of Powershell, Python, and other languages as the local industry dictates. Students will write programs and scripts to exercise their understanding of tools and concepts.

**Prerequisites/Corequisites:**

Course Completion of CS 81.21 ( or CIS 50.71)

**Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100

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

Description: This course offers an in-depth introduction to programming/scripting languages for system administration, web application auditing, cybersecurity and penetration testing. It provides an overview of modern scripting languages commonly used to build and extend

security tools. The course will introduce students to scripting on both the Microsoft and Linux platforms and will include an overview of Powershell, Python, and other languages as the local industry dictates. Students will write programs and scripts to exercise their understanding of tools and concepts. (Grade or P/NP)

Prerequisites/Corequisites: Course Completion of CS 81.21 ( or CIS 50.71)

Recommended: Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit:

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

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

**AS Degree:**      **Area**      Effective:      Inactive:

**CSU GE:**      **Transfer Area**      Effective:      Inactive:

**IGETC:**      **Transfer Area**      Effective:      Inactive:

**CSU Transfer:**      Effective:      Inactive:

**UC Transfer:**      Effective:      Inactive:

**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **Approval and Dates**

Version:	01	Course Created/Approved:	5/10/2021
Version Created:	11/28/2020	Course Last Modified:	7/2/2024
Submitter:	Michael McKeever	Course last full review:	5/10/2021
Version Status:	Approved New Course (First Version)	Prereq Created/Approved:	5/10/2021
Version Status Date:	5/10/2021	Semester Last Taught:	
Version Term Effective:	Fall 2022	Term Inactive:	Summer 2025

## **COURSE CONTENT**

**Student Learning Outcomes:**

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

1. Write, run and execute a script based on user requirements
2. Debug and correct errors in a sample script.

**Objectives:**

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

1. Write simple Transmission Control Protocol/Internet Protocol (TCP/IP) networking client and server scripts and programs
2. Write scripts to simplify system administration tasks
3. Write scripts for cybersecurity and penetration testing
4. Design and implement simple programs from user requirements

**Topics and Scope:**

1. Introduction to Scripting Languages including PowerShell
2. Python Basics including system administration tasks
3. Setting up your Python Environment
4. TCP/IP Networks and Sockets
5. Scapy and other Tools for Cybersecurity
6. Log Analysis and Processing
7. Web Application Exploitation and penetration testing
8. Vulnerability assessment tasks and tools
9. Command and Control Resources, such as GitHub, Bitbucket
10. Trojanning Windows Systems

**Assignment:**

Reading assignments include:

1. Online research of scripting practices and methods
2. Approximately 50 pages weekly from the textbook

Homework problems include:

1. Weekly online discussion thread participation
2. Hands-on exercises to demonstrate proficiency with each topic
3. Online quizzes (5 - 12)
4. Assignments for scripting practices and methods

Other assignments include:

1. Skill demonstration examinations
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
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Writing 5 - 10%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, assignments for scripting practices and methods
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Problem solving 15 - 30%
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**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances of scripting practices and methods, and skill demonstration examinations
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Skill Demonstrations 20 - 30%
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**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes and skill demonstration examinations

Exams  
20 - 30%

**Other:** 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:**

Bash Pocket Reference: Help for Power Users and Sys Admins. 2nd ed. Robbins, Arnold. O'Reilly. 2016 (classic)

Black hat Python: Python Programming for Hackers and Pentesters. 11th ed. Seitz, Justin. San Francisco No Starch Press. 2015 (classic)

Introduction to Scripting: National CyberWatch Center Edition. Miller & Ranum. 2017 (classic)

Learn Windows PowerShell in a Month of Lunches. 3rd ed. Jones, Don and Hicks, Jeffery. Manning Publications Co. 2016 (classic)

A Practical Guide to Linux Commands, Editors, and Shell Programming. 4th ed. Sobell, Mark G. Prentice Hall. 2017 (classic)

Violent Python: A Cookbook for Hackers, Forensic Analysts, Penetration Testers, and Security Engineers. O'Connor, TJ. Waltham, Mass. Elsevier. 2014 (classic)

## **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:	1	Both Certificate and Major Applicable
Repeatability:	00	Two Repeats if Grade was D, F, NC, or NP
Repeat group id:		

### **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	<a href="#">Either online or hybrid, as determined by instructor</a>
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