

COMP-4455 Course Syllabus

March 26, 2026

1 Course Information

Course Name	COMP-4455: Shell Scripting and System Tools
Prerequisites	COMP-4006
Required Textbook	No textbook required

2 Course Description

This course introduces students to shell scripting and common system tools in both Linux (primarily) and Windows (secondarily) Specifics of the course are as follows:

- Introduction to Linux and common system utilities
- Scripting Language for systems tasks (Bash, PowerShell)
- Programming using Bash (operators, structures, loops, functions)
- Linux fundamentals (processes, file systems, I/O)
- Process management in Bash
- File I/O in Bash
- Linux systems tools: (awk/sed/nc/cut/and many more)
- Windows system programming with PowerShell
- Networking utilities in Linux
- Basic network security overview and tools in Linux

3 Textbook and Materials

There is no required textbook for participation in this class. All materials will be available for students enrolled in the course at <https://canvas.du.edu> and online at various internal and external web sites. You will need a good internet connection and a laptop that meets DU specifications. (See <https://www.du.edu/it/support/how-to/students/laptops>). For technical support in using Canvas, please go to <http://otl.du.edu/knowledgebase/canvas>

4 Course Learning Objectives

Students that complete this course should exit being comfortable at a shell in Linux, and able to perform common systems tasks in that environment. They will, specifically:

1. Know many standard Unix/Linux tools and their usage
2. Understand the Linux design philosophy
3. Be able to navigate a Unix/Linux shell
4. Be familiar with how Unix/Linux systems manage devices
5. Know how Unix/Linux systems manage processes/threads, and how to create and manage them via scripting (Bash)
6. Accomplish common programming tasks using scripting/interpreted languages (Bash and PowerShell)
7. Be able to write programs utilizing system libraries based on reference material (man pages, online documentation, etc.)
8. Understand and be able to read/write Bash scripts and PowerShell scripts

5 Course Outcomes

The high level outcomes from this course are as follows:

1. Teach students to use a system from the command line, and get comfortable in that environment.
2. Give students coverage of many system tools and utilities and their usage, and empower them to supplement and find other ones when they need to.
3. Remove the mystery of shell scripting for students.

6 Program Level Goals

Courses in the cyber security MS program, including this one, should contribute to overall program level outcomes for students. This course contributes to the following program level goals:

1. **Understand how modern operating systems work (with a leaning towards Unix style OSes).** Be familiar with their security components (identification, authentication, access controls, auditing) and how to configure them.
2. Utilize and comprehend at least one compiled programming language (C/C++) and **two or more interpreted/scripting languages (Bash, PowerShell).**
3. Employ common tools and techniques used in the cyber security field. For example, **configuring firewalls**, IDSes, on-host security software and vulnerability scanners.

7 Knowledge Units

This course covers the following NSA cybersecurity Knowledge Units:

1. IT Systems Components (ISC, Foundational CDE)
2. Basic Scripting and Programming (BSP, Core Technical CDE)
3. Operating Systems Concepts (OSC, Core Technical CDE)
4. Basic Networking (BNW, Core Technical CDE)
5. Systems Programming (SPG, Optional KU)
6. Operating Systems Administration (OSA, Optional KU)

8 Grading Policy

Assignment	Weight
Homework	30%
Midterm Exam	30%
Final Exam	40%

9 Attendance Policy

Regular attendance is expected. Students are responsible for all material covered in class, including announcements and handouts.

10 Academic Integrity

All work submitted for this course must be the student's own original work. Any instance of plagiarism or cheating will be dealt with according to the university's academic integrity policy. Refer to the Student Rights and Responsibilities, as well as the University of Denver Student Honor code, here: <https://studentaffairs.du.edu/student-rights-responsibilities>

11 Disability Services

If you have a disability that may affect your ability to complete the work for this course, please contact the Disability Services office at: <https://studentaffairs.du.edu/disability-services-progr>