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Course Purpose

To teach the usage of UNIX and UNIX-like command environments, including basic UNIX command-line commands and utilities; and a UNIX-based scripting language.

Course Description (from the 2022-2023 catalog)

Introduces UNIX and UNIX-like command environments, including basic UNIX command-line commands and utilities; a representative UNIX interface; and a UNIX-based scripting language.

Course Goals

At the end of the semester the student will be able to:

- > Define the UNIX command environment
- > Apply the basic UNIX command set, including ssh; login; passwd; man; pwd; cd; ls; cat; more; cp; mv; rm; mkdir; rmdir; and logout.
- > Apply the fundamentals of UNIX file system operation: e.g., UNIX's single-rooted directory tree; the UNIX system of owner/group/world file permissions; hard and symbolic links; mount points; and standard file management commands.
- > Apply the principles of UNIX pathname resolution, including unqualified command and file name resolution, and the resolution of file names with special prefixes (., .., ~).
- > Apply how to use commonly used UNIX text editors: e.g., vim.
- > Demonstrate, through the use of simple examples, the concept of progressive output transformation through the use of pipes and filters: e.g., cut, paste, grep, sort, uniq, wc, tr, and awk, etc..
- > Describe UNIX multiprocessing commands: e.g., &, ps, jobs, ^Z, fg, bg, kill
- > Apply the bash shell, including built-in and user-defined environment variables; variable expansion; selection (if); looping (for, while); and status checking.
- > Understand the use of regular expressions as a tool for pattern-matching, including their use in the UNIX environment;
- > Understand the use of a recursive directory traversal utility for scanning the Unix file system (e.g., find);
- > Apply the use of a scripting language, and its application to UNIX system administration (e.g. bash)

Prerequisites

CSCI 1260

Major Topics

- > Basic UNIX command environment and command set
- > Users view of UNIX file system
- > UNIX name resolution
- > Creating and Editing files under UNIX
- > Pipes and filters
- > Multiprocessing
- > Unix shell(s) and scripting
- > Regular expressions
- > Recursive directory traversal
- > Introduction to UNIX system administration

Learning Outcomes

Demonstrate a working knowledge of the following UNIX competencies, as demonstrated through labs, homework, and exams

- > Commands
- > Mechanisms for pathname resolution (commands and filenames)
- > File system operation/navigation
- > Common filters
- > Multiprocessing commands (pipes)
- > Input/Output streams
- > Text editors (nano & vim)
- > Regular expressions
- > Shell scripting
 - o variables
 - o selection (if, case)
 - o branching (break, continue, return)
 - o looping (for, while)
 - o functions
 - o comments/documentation
 - o one-off vs. menu-driven
 - o formatted output
- > Strategies for managing Unix security
- > System administration tools, including tools for recursive directory traversal
- > Demonstrate the ability to write moderately complex shell scripts, as demonstrated through labs, homework, and exams (Student Outcomes 4b, 5c).

Major Assignments

This class's objectives will be met through the following types of assignments:

- > assigned readings from the text and supporting online resources

- > written homework assignments
- > labs
- > in-class assignments
- > quizzes or discussion questions
- > exams to assess understanding of the material

In the instructor's experience, the most effective way to master the Unix/Linux environment is practice. Thus, there will be numerous in- and-out-of-class opportunities provided to provide that experience. Activities such as 'walk-throughs,' where a series of commands is provided to illustrate a given desired outcome and 'problem-solving,' where a problem will be presented, and the student required to generate his or her own solution using known tools will be provided.

Graded Assignments (estimated)

Labs/Homework	~10	Variable/assignment	~250
Quizzes	~10	10 pts each	~100
In-class	~5	20 points each	~100
Exams			
Midterm - QA	1	100 points	100
Midterm - Coding	1	50 points	50
Final	1	150 points	150
Total Points			> 750

** It's difficult to predict how a semester will play out, schedule-wise. Weather, holidays, and unpredicted events can all have an impact on assignments. The above represents a best effort attempt at assigning appropriate work to complete, but the numbers are subject to change*

General

Assignments will be prefaced with a section describing expectations for the assignment and its grade points, e.g.,

Screenshots: 17@	2 points ea. (34 points)
Research questions: 10@	2 points ea. (20 points)
Total:	54 points

It is the student's responsibility to check D2L regularly for new assignments and quizzes, and their due dates. The instructor will make an effort to announce each assignment in class and to post due dates in the course calendar.

Lab Write Ups

Most of the lab assignments will involve two parts. First, walk-throughs of the current commands/tools for a given week to illustrate how each works. This part of the assignment will include several-to-many screenshots of your work in progress. Second, a series of “Research Questions” or “Exercises” for the student to apply those tools to a variety of common Unix/Linux-related tasks.

Each lab will include a required written report to be turned in to D2L for a grade. Lab write ups are generally due by the end of class. If the lab includes research questions/exercises, you will have three to four days from lab day to complete it (Specific dates will be provided via D2L).

There is an instructions document, **LabInstructions.docx**, and a template, **lab_report_template.docx**, available on D2L to help guide your activities.

Quizzes

Quizzes will be administered via D2L and will be completed outside of class. They will consist of questions from the assigned readings, labs, and lectures. Students will be given up to three attempts on each quiz, with question feedback provided for each non-true/false question. The highest score of the three attempts will be recorded.

Quizzes cannot be made up, if missed.

In-Class Exercises

There will be a series of exercises intended, as the name implies, to be completed during class meetings with guidance from the instructor. These will typically be more complex scripting exercises. Each will generate a document that will be turned in to D2L.

Students missing an in-class exercise will have the option to complete the activity on their own, within two days of the assignment’s due date, for half credit. In order to receive any credit, the completed script must work, without error, within parameters specified in the instructions.

Homework

There will be several homework assignments throughout the semester. Many of the assignments will be reading-based, using the *Linux Command Line, 2nd edition* textbook.

Late Work

You will be provided ample time to complete assignments. The instructor will be working through many of them with you.

Late submissions for labs and homework assignments **will not be accepted**. Quizzes will be presented via D2L and must be completed within the allotted timeframe.

Face it, folks: In the workplace, failure to meet deadlines is rarely, if ever, acceptable. This class is no different.

In general, missed tests may not be made up. However, in the event of a documented emergency, notify me when possible and arrangements will be made to accommodate your situation.

Optional Zoom Class Meetings

The instructor will on occasion, or as needed, host optional class meetings on Zoom to assist students with work. Typically, these meetings will be scheduled for Sundays at 2:00pm, unless otherwise specified.

Grading Scale

Percentage	Letter Undergraduate
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
60-69	D
0-59	F

Attendance Policy

[Class attendance](#) is required. If you miss a lecture, it is your responsibility to get a copy of the notes (assignments, announcements, etc.) from your classmates/D2L.

Make-up exams will be given for tests only in case of a documented legitimate excuse (illness, athletic event (for student athletes), ROTC activities, etc.) You should contact the instructor as soon as you know you will miss the test. Make-up for the final will be given in exceptional circumstances. Academic honesty standards will be enforced. No collaboration on the midterm or final is allowed.

As described in [Section 5.2](#) of the *East Tennessee State University Faculty Handbook*, June 1, 2001, you are expected to attend class regularly.

Unless otherwise specified, each week's lab assignment will be due by the end of the scheduled lab period.

Because of the strong correlation between attendance and success in this course, *the following attendance policy will be applied*: Unexcused absences in excess of 3 may directly affect your final grade as follows:

ABSENCES	PENALTY
1-3	None
4	-1 letter grade (-5 points off of final grade average)
5+	Additional 5-point decrement to final grade average

<=3	4	5	6	7	8	9	10+
0	-5	-10	-15	-20	-25	-30	(n-3)*5
Excessive absences grade decrement							

This action will be applied at the instructor's discretion. You must attend at least two-thirds of a day's scheduled class time to be considered present. Repeated lateness (*be advised: repeated tardiness is one thing that really annoys me*) or early departures may be counted as an absence at the instructor's discretion, following a warning. The instructor may or may not call roll (I usually do) prior to class meetings.

Contacting the Instructor

The contact numbers/email above may be used to reach the instructor at any time. The phone number, though, is the least reliable method. Much of this semester's office hours will be scheduled at the Brinkley Center in one of the transient offices to facilitate availability to students, so I won't be present in my Nicks Hall office (484) very often.

Email and Discord are the preferred methods of contact. The instructor welcomes student interaction and, unless occupied with another class or student at the time of contact, will make time available as needed to help.

If you are going to miss a class for any unexcused reason (i.e., any reason that does not generate some form of documentation explaining the unavoidable need for your absence), *do not send the instructor an email or other correspondence saying so*. Such email will be ignored.

Academic Integrity Policy

All activity associated with this course will be in line with the [University's applicable policies](#). If you are caught plagiarizing, you will be given a zero for the assignment, your final grade will be reduced by 1 letter grade (B+ to a C+, etc.), and an official report will be entered into your permanent record.

Subsequent acts of academic misconduct will be reported and will result in a grade of 'F' for the course.

Required Text

- > *The Linux Command Line, 2nd Edition* by William Shotts
- > *How Linux Works, 2nd Edition* by Brian Ward
- > *Unix in a Nutshell, Fourth Edition* (Paperback) by Arnold Robbins

All three are available free of (additional) charge via Safari Books online, which you can access through the Sherrod Library. Navigate to the [Sherrod Library](#) website. Click 'Research,' then 'Books and eBooks.' Scroll down to 'Safari Books Online.' It'll take a minute for the login to Safari, but then you can enter the book title(s) in the search bar. Safari will maintain a list of books you've been reading, so on future visits, you need only to click the 'See All' link on the right (under Your History).

Required – First Assignment

We're going to create ('spool up') a Virtual Machine running Ubuntu Linux as its operating system.

You will be required to have a laptop capable of running VirtualBox or have an external storage device with ~50 gigabytes of free space that can be used on the lab machines (this exercise cannot be completed using cloud storage such as OneDrive). This software must be installed, or you must have an external storage device before the first lab. The instructor has tested this using a flash drive. It works, but tends to be awful slow.

Oracle's VirtualBox software can be acquired at

<https://www.virtualbox.org/wiki/Downloads>

Before the start of the first lab class, you must have downloaded the [Ubuntu ISO](#) (image) file from [the Ubuntu website](#). (This is Ubuntu version 22.04). If you're using your laptop, you must have the VirtualBox hypervisor software (above) installed on it. VirtualBox can also be installed and will work on Apple machines.

If you're using the lab machines, you must have an external hard drive with the Ubuntu .iso (disk image) file saved to it. (You can use a USB flash drive (with a minimum of 32GB storage available), but it will operate a lot slower if you do). Time constraints may dictate that students complete this assignment outside of class. If so, accommodations will be made.

You will be awarded a quiz grade for completing this activity.

Course Topics (Tentative)

- Lecture 1 – Introduction to Unix
- Lecture 2 – Directories
- Lecture 3 – Working with files
- Lecture 4 – Common commands
- Lecture 5 – Pipes/Filters
- Lecture 6 – Regex
- Lecture 7 – Regex II
- Lecture 8 – Find
- Lecture 9 – BASH scripting
- Lecture 10 – BASH scripting
- Lecture 11 – BASH scripting
- Lecture 12 – AWK
- Lecture 13 – Formatting CLI output

Course Schedule

TBA. The planned schedule for this semester will be provided via D2L