NEW YORK CITY COLLEGE OF TECHNOLOGY/CUNY
Computer Systems Technology Department

COURSE: CST3523 – Task Automation in System Administration
(2 class hours, 2 lab hours, 3 credits)

Class Meetings:
Class Location:

Instructor:
Office Phone:
Email:
Office Location:
Office Hours:

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Course Description

A shell script is a simple, domain-specific program that acts as a task automation framework written for the shell, or command line interpreter, of an operating system. Shell scripts are very useful for System Administration and systems-level programmers (those that interact with the OS or network) to automate their daily tasks. Many shell script interpreters also double as command line interfaces. Typical operations performed by shell scripts include file manipulation, program execution, and networking management. This course will introduce shell script for both Unix/Linux and Windows operating systems. Through hands-on practices, students will learn basics of BASH to write scripts performing automation tasks in Unix/Linux. They will also learn basics of PowerShell and its use for task automation of Windows ® operating system.

Course Objectives

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

1. Write Unix/Linux shell scripts using BASH and TCSH
2. Use shell tools such as AWK and SED
3. Understand Objects, Variables, Arrays, Hashes, Files, Folders and, other scripting concepts for the Windows platform
4. Write Windows shell scripts using PowerShell

Prerequisites

CST 1201 and (CST 2405 or 2415) with grades of C or above.

Required Class Materials

1) Mark G. Sobell, "A Practical Guide to Linux Commands, Editors, and Shell Programming," 4th Edition, Addison-Wesley Professional, 2017, ISBN: 978-0134774602

Students using earlier editions of the textbook or other book for Unix/Linux and BASH as reference are required to map discussed subjects with sections of their books by themselves.

Optional Class Materials

2) Adam Bertram, "PowerShell for Sysadmins: Workflow Automation Made Easy," No Starch Press; Illustrated edition, 2020, ISBN: 978-1593279189
3) Jerry Lee Ford Jr., "Windows PowerShell Programming for the Absolute Beginner," 3rd Edition, Course Technology, 2014, ISBN: 978-1305260344
4) In-class materials

Technology Prerequisites

- The college provides email accounts to all City Tech-enrolled students. **All communications with students should use CityTech email accounts**. Students who had designated a personal email address as "Preferred" in CUNYFirst and Blackboard may miss important communications from the College and University.
- **iTec** (Instructional Technology and the Technology Enhancement Centers) supports students with their technology needs.

  Important contact details for iTec:

  Office Location: Room G601
  General Phone: (718)-254-8565
  Email: itec@citytech.cuny.edu
  Website: http://websupport1.citytech.cuny.edu/index.html
- **Blackboard**

  If a student needs help with Blackboard, visit:
  http://websupport1.citytech.cuny.edu/studentbb.html.
  For information on Blackboard Collaborate, read the document accessible at:
  http://websupport1.citytech.cuny.edu/websupport1/It/online/students/Student-BB_9.pdf.

Student's Attendance

Our class meets in-person.

Marking student's attendance:

- Student arriving during the first 20 minutes of class and staying in the class until the end will be marked "present" for that day
- Student arriving more than 20 minutes after the beginning of class but within the first half of it will be marked "late."

- Student timely arriving but leaving more than 20 minutes before the class ending will be marked "late/partial."
- In all other circumstance, Student will be marked "absent."

Attendance and class participation are essential and excessive absences may affect the final grade.

Academic Integrity Policy

You are prohibited from sharing, submitting or posting on the Internet your or disseminating in any electronic or printed form any course materials (assignments, tests, quizzes, assignments, etc.) as well as any completed work you turn in to me. Students who reproduce exams or quiz questions, or their other completed work, are subject to an academic integrity violation according to CUNY Academic Integrity policy.

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

The professor of the course has the authority to give a grade of **F** if the student submits the work of another person in a manner that represents his/her work, or knowingly permits one's work to be submitted by another person without the instructor's permission (see College Catalog more details on Academic Integrity Policy). **The professor preserves the right to ask the student to defend any of his/her assignment or test if the authorship of submitted work raises questions.**

Policy against cheating:

- Any cheating attempt will not be tolerated. You will get 0 points for an exam if I suspect that you cheat, without deliberating it with a cheating student at any time.
- I will submit a Faculty Action Report (FAR) form to CityTech's Academic Integrity Office **in all circumstances where I suspect an academic dishonesty, I will write a Faculty Action Report form about the incident and provide it to the NYCCT Academic Integrity Officer.** You will have the right to contest allegations of academic dishonesty with the NYCCT Academic Integrity Officer.

College Diversity Statement

This course welcomes students from all backgrounds, experiences, and perspectives. In accordance with the City Tech and CUNY missions, this course intends to provide an atmosphere of inclusion, respect, and mutual appreciation of differences so that together we can create an environment where all students can flourish. It is the instructor's goal to provide materials and activities that are welcoming and accommodating of diversity in all of its forms, including race, gender identity and presentation, ethnicity, national origin, religion, cultural

identity, socioeconomic background, sexuality, and sexual orientation, ability, neurodivergence, age, and etc. Your instructor is committed to equity and actively seeks ways to challenge institutional racism, sexism, ableism, and other forms of prejudice. Your input is encouraged and appreciated. If a dynamic that you observe or experience in the course concerns you, you may respectfully inform your instructor without fear of how your concerns will affect your grade. Let your instructor know how to improve the effectiveness of the course for you personally or for other students or student groups. We acknowledge that NYCCT is located on the traditional homelands of the Canarsie and Lenape peoples.

Blackboard Navigation

Class materials and grades can be accessed through registered student's account on Blackboard

Grading Procedure

Exams[1]	60%
Assignments and Projects	30%
Participation[2]	10%
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TOTAL	100%

Letter Grade	A	A-	B+	B	B-	C+	C	D	F
Numerical Grade	93-100	90-92.9	87-89.9	83-86.9	80-82.9	77-79.9	70-76.9	60-69.9	<=59.9

Course Outline

Following is a tentative schedule for class

Meeting weeks (tentative)	**Topics**	**Reading** (See Class Materials for reference numbers)
1-2	Introduction/review of Linux part I	1) Chapter 1, 2, 3, 6

[1] 2-3 exams covering all the material taught during the semester.

[2] Class Participation is based on how much students engaged during our classes and labs. Students should strive to: *(i)* be part of in-class discussions, *(ii)* refrain from browsing unrelated websites or other sources during class meetings, *(iii)* keep low number of missed classes, *(iv)* keep low number of late arrivals and early departures, *(v)* actively participate in all in-class and take-home lab activities. Only students that satisfy *(i)-(v)* may obtain full percentage for their class participation.

2-3	Introduction to Linux shells	1) Chapter 5
3	Regular Expressions	1) Appendix
4-6	BASH Scripts: - Startup Files - Redirection and Pipes revisited - Job Control - Manipulating the Directory Stack - Parameters and Variables - Processes - History - Writing a Simple Shell Script - Executing and Editing Commands - Functions	1) Chapter 8
	Exam 1, Linux and BASH fundamentals	1) Everything studied up to this point
7-8	BASH Scripts: - Controlling bash Features and Options - Processing the Command Line	1) Chapters 7-8
8-9	AWK interpreted programming language designed for text processing and typically used as a data extraction	1) Chapter 14
10	SED utility for parsing and transforming text, using a simple, compact programming language	1) Chapter 15
10	**Exam 2**, Linux fundamentals, BSH scripting	1) Everything studied up to this point
11	Outline of TCSH and how it differs from BASH Linux scripting	1) Chapter 9
11-14	Windows PowerShell - Introduction - Objects, Variables, Arrays, and Hashes - Conditional Logic and Loops - Functions - Working with Files and Folders in PowerShell	2) Chapter 1-9 3) Chapter 1-8 4)
	Exam 3, Linux, BASH scripting and PowerShell	1), 2), 3), 4) Everything studied up to this point

Assessment Criteria

For the successful completion of this course a student should be able to:	Evaluation methods and criteria
Demonstrate understanding of redirecting Standard Error, Job Control, Manipulating the Directory Stack, and other Systems Programming/Administration concepts for Unix/Linux.	Students will implement Shell Scripts using BASH and TCSH on a Unix/Linux platform both in class laboratory exercises and homework assignments.
Demonstrate understanding of Objects, Variables, Arrays, Hashes, Files, Folders and other scripting concepts for the Windows platform.	Students will implement Shell Scripts using PowerShell on a Windows platform both in class laboratory exercises and homework assignments.
Demonstrate understanding of the use of shell tools.	Students will do in class laboratory exercises and homework assignments which utilize AWK and sed.