

**Kutztown University
Kutztown, Pennsylvania**

**Computer Science Department
College of Liberal Arts and Sciences**

I. Course Description: CSC 252: UNIX Scripting and Administration

This course deals with the study of the UNIX operating system, particularly, systems programming and administration. Under the former, such topics as UNIX commands, filters, shell scripts, system security, user accounts, system backup and rebooting, and associated utilities are studied. In addition, software procurement, and installation will be illustrated. Meaningful applications, which illustrate the topics, will be given.

3 s.h. 3 c.h. Prerequisites: CSC120 or CSC123 or CSC135

II. Course Rationale

UNIX has become a common operating system for servers. It is necessary for students to be able to navigate UNIX as a user and administrator. It is the purpose of this course to provide the students with such opportunity. This will enable the students to enter the workforce fully prepared for professional careers in information technology and computer science.

III. Course Objectives

Upon satisfactory completion of this course the student will be able to:

- A. Define basic terminology used in UNIX and converse in terms common to UNIX.
- B. Explain the tasks associated with UNIX system administration.
- C. Demonstrate the ability to find, download, and install appropriate software, e.g., compilers, specialized servers, editors, and other utilities for the users.
- D. Understand the use of signals and pipes.
- E. Solve practical problems using various UNIX utilities.
- F. Demonstrate effective oral communication by presenting a UNIX topic.

IV. Course Assessment

The course assessment will be a subset of tests, projects, papers, presentations, quizzes, homework, team assignments and final exam.

V. Course Outline

CSC 252: UNIX Scripting and Administration - Spring, 2018

- A. Introduction
 - 1. The on-line manual
 - 2. Directories and Files
 - i. Permissions
 - ii. Links
 - a. hard
 - b. symbolic

- B. The shell
 - 1. Bourne, Korn, C-shell, Bash
 - 2. I/O redirection
 - 3. Piping commands
 - 4. UNIX utilities
 - 5. Shell variables and the user environment

- C. System administration
 - 1. Managing user accounts and groups
 - 2. Shutting down, backing-up, and rebooting the system.
 - 3. Finding, downloading, uploading, unpacking, and installing software and patches
 - 4. Disk partitioning
 - 5. SUN's Network File System (NFS)
 - 6. File archiving 7. System log files

- D. Shell scripts
 - 1. Shell variables
 - 2. Control structures
 - 3. Arrays
 - 4. user input
 - 5. command-line arguments
 - 6. Accessing directory and file permissions
 - 7. The shell interpretation process

- E. UNIX files and directories
 - 1. Access primitives (read, write, open, close)
 - 2. Users, owners, permission (euid, egid, suid, sgid)
 - 3. File information with fstat and stat
 - 4. Programming with directories
 - 5. Device files

- F. Process
 - 1. The process id
 - 2. Process creation
 - 3. Process table

- G. Text Processing
 - 1. Regular expressions
 - 2. sed
 - 3. awk

H. Scripting language(s)

VI. Instructional Resources

Das, S. *Your UNIX/LINUX: the ultimate guide*, Third edition. New York, McGraw-Hill, 2013. QA76.76.063 D3495 2013.

Kerrisk, M. *The Linux programming interface: a Linux and UNIX system programming handbook*. San Francisco, No Starch Press, 2010. QA76.76.O63 K496 2010eb.

Kochan, S. and Wood P. *Shell Programming in Unix, Linux, and OS X*. 4th edition. Addison-Wesley Professional. 2016.

Makan, K. *Penetration testing with the Bash shell : make the most of the Bash shell and Kali Linux's command-line-based security assessment tools*. Birmingham, UK. Packt Pub. 2014. TK5105.59 M343 2014.

McManus, S. and Cook, M. *Raspberry Pi for dummies*, Second Edition. Hoboken, NJ, John Wiley & Sons, 2015. QA76.8.R15 M24 2015.

Muster, J. *UNIX made easy: Unix and Linux basics & beyond*. 3rd edition. Berkeley, CA. McGraw-Hill/Osborne. 2002. QA76.76.O63 M87 2002.

Nemeth, E., Snyder, G., Hein, T., Whaley, B., and Mackin, D. *Unix and Linux system administration handbook*. 5th edition. Prentice Hall. 2017. (First edition available in the library)

Newham, C. and Rosenblatt, B. *Learning the bash shell*. 3rd edition. Sebastopol, CA. O'Reilly. 2005. QA76.76.O63 N458 2005.

Parker, S. *Shell scripting: expert recipes for Linux, Bash, and more*. Hoboken, N.J., Wiley, 2011. QA76.76.O63 P37 2011eb.

Pate, S. D. *UNIX filesystems: evolution, design and implementation*. Indianapolis, IN. Wiley. 2003. QA76.76.O63 P3773 2003.

Ray, E. and Ray, D. *Unix and Linux: visual quickstart guide*. 5th edition. Peachpit Press. 2014.

Robbins, A. *Bash pocket reference*. Sebastopol, CA, O'Reilly Media, 2010. QA76.76.063 R599 2010

Robbins, A. *UNIX in a nutshell*. 5th edition. Cambridge, MA. O'Reilley. (2006). QA76.76.O63 R566 2006.

Sarwar, S. M., and Koretsky, R. A. *Unix, the textbook*. 3rd edition. Chapman and Hall/CRC. 2016. (1st edition in library: QA76.76 .O63 S3555 2001).

Schwartz, D. *Introduction to UNIX*. 2nd edition. Prentice Hall. (2006). QA76.76.O63 S439 2006.

Shotts Jr., W. *The Linux Command Line: A Complete Introduction*. No Starch Press. 2012.

Silberschatz, A, Galvin, P. B., and Gagne, G. *Operating system concepts essential*, Second edition. Hoboken, NJ, John Wiley and Sons, Inc., 2014. QA76.77 S555 2014

Taylor, D. *Sams Teach Yourself Unix in 24 Hours: Covers X, Linux, and Solaris*. 5th edition. Sams Publishing. 2015.

Upton, E. and Halfacree, G. *Raspberry Pi user guide*, Third Edition. Hoboken, NJ, Wiley, 2014. QA76.8.R19 U68 2014

Vogel, M. *Get Started with the Linux Command Line: Files, Directories, and Disks*. Amazon Digital Services LLC. 2017.