

CIS 030: INTRODUCTION TO LINUX OPERATING SYSTEM

New Course Proposal

Date Submitted: Tue, 20 Oct 2020 23:38:17 GMT

Originator

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Justification / Rationale

New course. It will be used as an elective in both of the CIS AS degrees. Linux is widely used by system administrators in the industry.

Effective Term

Fall 2020

Credit Status

Credit - Degree Applicable

Subject

CIS - Computer Information Systems

Course Number

030

Full Course Title

Introduction to Linux Operating System

Short Title

LINUX

Discipline

Disciplines List

Computer Information Systems (Computer network installation, microcomputer technology, computer applications)

Modality

Face-to-Face
100% Online

Catalog Description

Introduction to the Linux operating system primarily focused on command line usage. Covers the history, kernel, file systems, shells and user utilities. Also introduces students to the fundamentals of shell programming, processes, communications, and basic security.

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Lecture Units

2

Lecture Semester Hours

36

Lab Units

1

Lab Semester Hours

54

In-class Hours

90

Out-of-class Hours

72

Total Course Units

3

Total Semester Hours

162

Required Text and Other Instructional Materials**Resource Type**

Book

Open Educational Resource

No

Author

Nemeth, Evi; Snyder, Garth; Hein, Trent; Whaley, Ben; Mackin, Dan

Title

UNIX and Linux System Administration Handbook

Edition

5th

Publisher

Addison-Wesley Professional

Year

2017

Flesch-Kincaid Level

12

ISBN #

978-0134277554

Resource Type

Book

Open Educational Resource

No

Author

Bresnahan, Christine; Blum, Richard

Title

Linux Essentials

Edition

2nd

Publisher

Sybex (Wiley)

Year

2015

College Level

Yes

Flesch-Kincaid Level

12

ISBN #

978-1119092063

Resource Type

Book (Recommended)

Open Educational Resource

No

Author

Ward, Brian

Title

How Linux Works: What Every Superuser Should Know

Edition

2nd

Publisher

No Starch Press

Year

2014

Resource Type

Book (Recommended)

Open Educational Resource

No

Author

Hahn, Harley

Title

Harley Hahn's Guide to UNIX and Linux

Edition

1st

Publisher

McGraw-Hill Higher Education

Year

2008

For Text greater than five years old, list rationale:

Harley Hahn's book is a classic in Linux instruction and still relevant. I just want to give the instruction the option of using it.

Class Size Maximum

35

Course Content

1. Overview
 - a. Brief overview of operating systems
 - b. Overview and features of Linux
 - c. Pros and cons of Linux

2. History and Philosophy
 - a. Original and current philosophies
 - b. Origin and history of Linux systems and their derivatives
 - c. Overview of Linux standards
3. Components of Linux
 - a. Kernel
 - b. Shells
 - c. Utilities
 - d. Shell command line vs. GUI
4. The kernel and its subsystems
 - a. System Call Interface, File subsystem, I/O and device subsystem
 - b. Process Control: scheduler, time slicing
 - c. Memory management: paging vs. swapping
5. Getting Started with Linux
 - a. How to log in and log out
 - b. User accounts
 - c. The superuser
 - d. Account settings and configuration
 - e. Commands for getting information
 - f. Stopping a program
6. Introduction to Linux Shells
 - a. Function of shells
 - b. Comparison of Linux shell types
 - c. Shell environment
 - d. Shell variables and environment variables
 - e. Using variables
7. More about the Shell
 - a. Meta-characters
 - b. Quoting and escaping
 - c. Built-in and external commands
 - d. Search path
 - e. Aliases
 - f. Basic shell programming functions
8. Overview of Commands
 - a. Understanding man pages
 - b. Command line syntax
 - c. Arguments and options
 - d. command line history
 - e. command line completion
 - f. command line editing
9. Filter Commands
 - a. Displaying files
 - b. Comparing files
 - c. Counting lines, words and characters
 - d. Sorting data
 - e. Selecting lines
10. The Linux Filesystem
 - a. Overview of files
 - b. inode concepts
 - c. Hardware and processes as file abstractions
 - d. Modern Linux filesystem types
 - e. Hierarchical organization of filesystems
 - f. Directory organization
11. Working with Directories and Files
 - a. Absolute and relative pathnames
 - b. Working directory
 - c. Moving about in the filesystem

- d. Basic directory operations
 - e. Basic file operations
 - f. Permissions
 - g. Links
 - h. Finding files
12. Processes
 - a. Kernel management of processes
 - b. System processes vs. user processes
 - c. Foreground vs. background processes
 - d. Displaying process information
 - e. Suspending and killing processes
 13. Regular Expressions
 - a. Introduction to regular expressions
 - b. Matching lines, words and characters
 - c. Character classes
 - d. Operators
 - e. Introduction to sed and awk
 14. Input and Output
 - a. Standard input
 - b. Standard output and standard error
 - c. Redirection
 - d. Pipes
 - e. File descriptors
 15. Communications
 - a. Introduction to basic utilities
 - b. Connecting to remote computers
 - c. Transferring files
 16. Text Editors
 - a. Comparison of Linux text editors
 - b. Text editor basics
 - c. How to create, open and save a file
 - d. Editing a text file

Lab Content

1. Getting started with Linux
 - a. Create a new user account with user id and password.
 - b. Enter commands such as whois, which and whereis to get basic information.
 - c. Run and stop programs from the command line.
 - d. Alter user account settings.
2. Using basic commands
 - a. Demonstrate the use of commands to display, compare, count, sort and select files and text.
 - b. Use a text editor to incorporate commands into small scripts.
 - c. Explore the Linux man pages to gain information on command purpose and use.
 - d. Demonstrate the use of command options to alter the behavior of commands.
3. Exploring various environment and shell variables in the Linux operating system.
 - a. Develop understanding of the numeric and string variable types as well as allowed operations on each.
 - b. Gain experience in effectively using the text editor to edit system files.
 - c. Use the text editor and command line to alter the value assigned to certain shell and environment variables.
 - d. Deduce the effect working with shell and environment variables has on the shell environment.
4. Mastering the command line
 - a. Explore command line syntax through reading man pages and trial and error.
 - b. Interact with utilities by typing arguments and options on the command line.
 - c. Practice the use of the command line history and command line completion while invoking basic commands.
 - d. Play the role of user and programmer, alternately, to establish a command line-interaction plan for a program.
5. Files and directories
 - a. Become familiar with the history and concepts of the Linux filesystem.
 - b. Practice moving about the filesystem to become familiar with the hierarchical organization of files.

- c. Understand the Linux permissions by viewing and changing permissions on both files and directories.
- d. Use a variety of commands to perform basic operations on the filesystem including moving, creating and deleting files and directories.
- 6. Finding, reading and writing files
 - a. Use utilities to assist in the location of files in the Linux system.
 - b. Write a short script which uses redirection to send output to a specified file.
 - c. Gain experience with pipes to send output from one command to another command.
 - d. Incorporate regular expressions into a grep call to refine search terms.
- 7. Communicating with remote computers
 - a. Demonstrate the use of basic commands to transfer files to and from a remote computer.
 - b. Gain experience with file transfer protocols.
 - c. Explore the use of a variety of methods to connect along with the benefits and risks of each.
 - d. Investigate the need for security in communicating with external machines and develop strategies to lessen security risks.
- 8. Demonstrating the Linux text editor
 - a. Compare the features of two or more text editors in the Linux environment.
 - b. Use the basic commands of a text editor to create a new file, write and edit text and save the file.
 - c. Edit a script using the text editor's commands for moving around and editing.

Course Objectives

	Objectives
Objective 1	Describe the basic features of the Linux operating system.
Objective 2	Articulate the history and philosophy of Linux systems and standards.
Objective 3	Discuss the various components of Linux.
Objective 4	Create a user account, logon and get information using commands on a Linux system.
Objective 5	Compare Linux shell types and use variables in the shell environment.
Objective 6	Outline a basic shell script and demonstrate the understanding of the shell through the use of an alias and built in commands.
Objective 7	Use the man pages effectively and show proficiency in using the command line.
Objective 8	Display, count, sort and compare files using filter commands.
Objective 9	Discuss the Linux files system concepts and organization.
Objective 10	Perform directory and file operations including changing permissions, creation, deletion, moving and renaming.
Objective 11	Demonstrate an understanding of user and system processes and basic process operations.
Objective 12	Use regular expressions to effectively describe desired search patterns.
Objective 13	Write code to redirect input and output to and from the user, files and commands using redirection and pipe.
Objective 14	Connect to remote computers and transfer files using Linux commands.
Objective 15	Create and edit text files in a Linux text editor to illustrate knowledge of the text editor functions and commands.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Describe the various aspects of the Unix operating system from a user and administrator perspective.
Outcome 2	Perform the basic tasks of a system administrator necessary for an operational Linux environment.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Lecture	Lectures which include history, structure and use of the Linux operating system.
Laboratory	A lab assignment web-page located on a college-hosted course management system or other department-approved Internet environment. Here, the students will review the specification of each laboratory assignment and submit their completed work.

Participation	A discussion web-page located on a college hosted course management system or other department-approved Internet environment. Here, students can request assistance from the instructor and interact publicly with other class members.
Discussion	In person or on-line discussion which engages students and instructor in an ongoing dialog pertaining to all aspects of the Linux operating system.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Written homework	Multiple step-by-step homework assignments, will provide a positive learning environment where students interact with the Linux operating system and build on their skills and knowledge as they progress.	Out of Class Only
Laboratory projects	Work with students on projects that represent real world Linux computer maintenance scenarios.	In Class Only
Group activity participation/observation	Students will work on group projects that represent real world Linux system administrator tasks.	In and Out of Class
Product/project development evaluation	Class and individual skill assessment projects will cover key areas of Linux administration and installation.	In Class Only
Mid-term and final evaluations	Students will complete summative midterm and final assessments.	In Class Only
Computational/problem-solving evaluations	Students will be presented with various issues common to a Linux system admin whose solution will require they implement the material learned in class.	In and Out of Class
Presentations/student demonstration observations	Students will present to the class their results of the group projects in which they had to solve issues or provide system admin services.	In Class Only
Tests/Quizzes/Examinations	There will be regular examinations to assess student learning.	In Class Only
Written homework	Detailed review of written assignments which includes model solutions and specific comments on the student submissions.	Out of Class Only

Assignments
Other In-class Assignments

Students will complete an analysis of ongoing Case Studies from an end of chapter exercise in the textbook to apply operating systems principles

Apply critical thinking to a Situation Analysis scenario given in the text book.

Students will complete projects and case studies designed to implement and troubleshoot operating systems in use today.

Other Out-of-class Assignments

Students will be assigned readings from the textbook and from the Learning Modules on the website.

Every end of chapter section includes an ongoing Case Study which will be assigned.

Writing technical prose documentation that supports and describes the assignments that are submitted for grades.

Grade Methods

Letter Grade Only

Distance Education Checklist

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?

The lab component will be focused around student activities performed on their Linux OS that are based on the lecture. They will then turn in different types of proof of completion of those activities.

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?

Getting started with Linux, Using basic commands, Exploring various environment and shell variables in the Linux operating system, Communicating with remote computers. The instructor will require some type of proof of completion of these activities (output, screenshot, etc.)

How will you assess the online delivery of lab activities?

We will base our assessment of these online activities on student evaluation, student retention, efficiency, and effectiveness.

Instructional Materials and Resources

If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?

We MAY be using McGraw-Hill's online system for this course. We are not sure yet as I have not had a chance to fully evaluate it.

If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.

Their LMS contains various lab activities followed by similar activities which they are to complete. The activities also contain videos that explain the process in detail.

Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

Within Course Management System:

- Timely feedback and return of student work as specified in the syllabus
- Discussion forums with substantive instructor participation
- Chat room/instant messaging
- Regular virtual office hours
- Private messages
- Online quizzes and examinations
- Video or audio feedback
- Weekly announcements

External to Course Management System:

- Direct e-mail
- E-portfolios/blogs/wikis
- Posted audio/video (including YouTube, 3cm mediasolutions, etc.)
- Synchronous audio/video
- Teleconferencing
- Telephone contact/voicemail

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

There will be weekly discussions regarding topics related to the course with appropriate instructor participation. Students will create logs describing the process to diagnose an issue. These logs are uploaded to the LMS and receive appropriate instructor feedback.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.

The CMS for McGraw-Hill contains videos and simulations that further learning.

Other Information

MIS Course Data

CIP Code

11.0103 - Information Technology.

TOP Code

070100 - Information Technology, General

SAM Code

C - Clearly Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Funding Agency Category

Not Applicable

Program Status

Program Applicable

Transfer Status

Transferable to both UC and CSU

General Education Status

Not applicable

Support Course Status

Course is not a support course

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Files Uploaded

Attach relevant documents (example: Advisory Committee or Department Minutes)

Final Minutes_ICT 3_1_18.pdf

Approvals

Curriculum Committee Approval Date

5/7/2018

Academic Senate Approval Date

5/9/2019

Board of Trustees Approval Date

6/12/2019

Chancellor's Office Approval Date

7/27/2019

Course Control Number

CCC000607683

Programs referencing this course

Computer Information Systems Associate of Science (<http://catalog.collegeofthedesert.eduundefined/?key=323>)