Cerro Coso College

Course Outline of Record Report

10/12/2021

ITC290 : Linux System Administration I

General Information

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Course Code (CB01) :	ITC290
Course Title (CB02) :	Linux System Administration I
Department:	Business Information Technolog
Proposal Start:	Fall 2020
TOP Code (CB03) :	(0702.00) Computer Information Systems
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	Yes
Course Control Number (CB00) :	No value
Curriculum Committee Approval Date:	03/06/2020
Board of Trustees Approval Date:	04/09/2020
External Review Approval Date:	04/09/2020
Course Description:	This course is an in-depth examination of Linux basic foundations, including concepts of installation, operations, and maintenance of the Linux Operating System. Using a combination of Red Hat Academy foundational resources and open source utilities, students will study and practice the basics of the operating system, its graphical user interface, and its networking services.
Submission Type:	This submission is the result of years of requests from the IT/Cyber Security Advisory Board. They continue to increase their needs each year. No value
Author:	No value

Faculty Minimum Qualifications

Master Discipline Preferred:	• Computer Information Systems (Computer network installation, microcomputer technology, computer applications)
Alternate Master Discipline Preferred:	No value
Bachelors or Associates Discipline Preferred:	• Computer Information Systems (Computer network installation, microcomputer technology, computer applications) • Computer Science
Additional Bachelors or Associates Discipline Preferred:	• Computer Information Systems (Computer network installation, microcomputer technology, computer applications) • Computer Science

Course Development Options

Basic Skills Status (CB08)

Course is not a basic skills course.

☐ Allow Students to Gain Credit by Exam/Challenge

Rationale For Credit By Exam/Challenge

No value

Course Support Course Status (CB26)

No value

Course Special Class Status (CB13)

Course is not a special class.

Allowed Number of Retakes

3

Retake Policy Description

No value

Grade Options

- Letter Grade Methods

Course Prior To College Level (CB21)

Not applicable.

☑ Allow Students To Audit Course

Associated Programs

☑ Course is part of a program (CB24)

Associated Program	Award Type	Active
Linux Operating System	Certificate of Achievement	Fall 2020

Transferability & Gen. Ed. Options

Course General Education Status (CB25)

No value

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

Units and Hours

Summary

Minimum Credit Units (CB07)	3
Maximum Credit Units (CB06)	3
Total Course In-Class (Contact) Hours	90
Total Course Out-of-Class Hours	72
Total Student Learning Hours	162
Faculty Load	0

Credit / Non-Credit Options

Course Credit Status (CB04)

Credit - Degree Applicable

Course Non Credit Category (CB22)

Credit Course.

Non-Credit Characteristic

No Value

Course Classification Status (CB11)

Credit Course.

Funding Agency Category (CB23)

No value

☐ Cooperative Work Experience Education Status (CB10)

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Classs
Lecture Hours	2	4
Laboratory Hours	3	0
Activity Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	36
Laboratory	54
Activity	0
Total	90
Course Out-of-Class Hours	
Lecture	72
Laboratory	0
Activity	0
Total	72

Time Commitment Notes for Students

No value

Faculty Load

Extra Duties: 0

Faculty Load: 0

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

ITC101 - Introduction to Computer Information Systems

Students need to understand what an Operating System (OS) (Ex. Windows, MacOS or Linux) is, how to use, install and configure the OS applications. The student must understand an OS's file system structure and use of file system utilities. The student must also understand the concept of a Central Processing Unit (CPU), system memory and data storage. This material is covered in the IT C101/CSCI C101 course.

AND

Advisory

ITC142 - Information & Communication Technology Essentials

Students need to know the essential skills for individual computer repair to assist them as they complete the skills for an Information Technology Technician. These skills include computer hardware identification and basics of building a computer to include the installation of components (power supplies, motherboards, processors, memory, and expansion card). In addition, students need to have experience and knowledge of installing and configuring operating systems, application software and updates. Additionally, there is a basic Linux command line material in the course. This material is covered in the IT C142/CSCI C142 course.

AND

Advisory

ITC143 - Computer Network Fundamentals

Students need a basic understanding of networking terminology, network structure to transfer that knowledge to network security. This material is covered in the IT C143 course.

OR

Entrance Skills

Entrance Skills	Description
No value	No value

Limitations on Enrollment

Limitations on Enrollment	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction	Instruction through examination or quizzing

Rationale

Students will complete quizzes and examinations within the courses (online and on ground). This will include short answer and multiple-choice questions.

Methods of Instruction	Discussion
Rationale	Discussion: Students will participate to critically explore concepts and compare elements of the text, weekly lab computer-based simulations, and projects from the week. Example: Discuss managing files from the command line and the efficiency of different commands. Online: Students will participate in weekly discussions. Students will post one individual initial posting per week and reply to a minimum of two classmates. The instructor will also participate in the board and the student replies. For example, the instructor may rotate through one-half of the class each week to reply to all students equally throughout the course. On-ground: Students will participate in class discussions with the instructor or/and fellow students.

Methods of Instruction	Laboratory
Rationale	Hands-on Lab: Students will complete computer-based weekly simulations to learn and reinforce the practical application of theories presented in the text. Labs will also provide insight and training into real-world tasks for Linux administrators and will provide them with a preparedness to enter the workforce and pass the industry certification exam (Red Hat). Example: Configure the basic setup of a Linux operating system using the command-line interface or graphical user interface.

Methods of Instruction	Lecture
Rationale	Weekly lecture notes will be provided that include language to describe course concepts and further student's understanding and preparedness to work in a cloud-based environment. Students will also view PowerPoint presentations with content from each module.

Assignments

A. Chapter reading (Example: Reading the assigned chapters from the textbook based on the topics for the week).
B. Weekly step-by-step assignments (Example - Explain basic concepts related to using the Linux command-line interface.).
C. Weekly application simulations assignments (Example: Setup a computer system to utilize the Linux operating system.)

Methods of Evaluation	**Rationale**
Participation	Discussion: Students will participate to critically explore concepts and compare elements of the text to demonstrate understanding. Grading is done with a rubric and instructors evaluate student posts to determine they understand the concepts responding both in the discussion area and through the grading section. Example: Discuss managing files from the command line and the efficiency of different commands. Hands-on Lab: Computer-based labs/activities will reinforce the practical application of theories presented in the text. Labs will also provide insight and training into real-world tasks for Linux administrators. Labs/activities will be evaluated by reviewing the steps/scores students take through the labs to demonstrate competency. Example: Configure automated Linux installations with kickstart
Tests	Objective Exams: Objective exams will evaluate the student's comprehension of the text material and prepare them for the Red Hat Administration certification exam environment. Example: Multiple-choice and essay questions covering Linux administration configuration and settings.

	Comprehensive Exam: An objective comprehensive exam will evaluate a student's preparedness for the Red Hat Linux exam (RH Administration I exam) following completion of both courses (IT C290/291). Example: Describe the installation of Red Hat Enterprise operating system.
Distance Education Description: how outcomes are evaluated	Assignments for the online course are in line and similar to the assignments that are offered on ground. The SLO's are assessed through rubric and objective assignments such as discussion boards, exams, and homework.

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Smyth, Neil	Red Hat Enterprise Linux 8 Essentials: Learn to install, administer and deploy RHEL 8 systems	Payload Media	June 13, 2019	13: 978-0-9860273-9-0

Other Instructional Materials

Description	Red Hat Academy content.
Author	Red Hat
Citation	No value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

No value

CSLOs

Apply Linux philosophy and concepts. Expected SLO Performance: 70.0

Perform core system administrative duties such as managing the file system, managing users and groups, and configuring file system permissions. Expected SLO Performance: 70.0

Configure Linux processes, priorities, logging and control for Linux services. Expected SLO Performance: 70.0

Analyze and explain troubleshooting Linux network configuration methods. Expected SLO Performance: 70.0

Describe the proper method to install and configure software updates.

Expected SLO Performance: 70.0

Outline

Course Outline

1. Accessing the command line
    a. Accessing the command line using the local console
    b. Accessing the command line using the desktop
    c. Executing commands using the bash shell
2. Managing files from the command line
    a. The Linux file system hierarchy
    b. Locating files by name
    c. Managing files using command-line tools
    d. Matching file names using path name expansion
3. Getting help in Red Hat Enterprise Linux
    a. Reading documentation using man command
    b. Reading documentation using pinfo command
    c. Reading documentation in /usr/share/doc
    d. Getting help From Red Hat Linux vendors and open sources
4. Creating, viewing, and editing text Files
    a. Redirecting output to a file or program
    b. Editing text files from the shell prompt
    c. Editing text files with a graphical editor
5. Managing local Linux users and groups
    a. Users and groups
    b. Gaining superuser access
    c. Managing local user accounts
    d. Managing local group accounts
    e. Managing user passwords
6. Controlling access to files with Linux file system permissions
    a. Linux file system permissions
    b. Managing file system permissions from the command line
    c. Managing default permissions and file access
7. Monitoring and managing Linux processes
    a. Processes
    b. Controlling jobs
    c. Killing processes
    d. Monitoring process activity
8. Controlling services and daemons
    a. Identifying automatically started system processes
    b. Controlling system services
9. Configuring and securing OpenSSH service
    a. Accessing the remote command line with SSH

    b. Configuring SSH Key-based authentication
    c. Customizing SSH service configuration
10. Analyzing and storing logs
    a. System sog architecture
    b. Reviewing Syslog files
    c. Reviewing systemd journal entries
    d. Preserving the systemd journal
    e. Maintaining accurate time
11. Managing Red Hat Enterprise Linux Networking
    a. Networking concepts
    b. Validating network configuration
    c. Configuring networking with nmcli
    d. Editing network configuration ciles
    e. Configuring host names and name resolution
12. Archiving and copying files between systems
    a. Managing compressed tar archives
    b. Copying files between systems securely
    c. Synchronizing files between systems securely
13. Installing and updating software packages
    a. Attaching systems to subscriptions for software updates
    b. RPM software packages and yum
    c. Managing software updates with yum
    d. Enabling yum software repositories
    e. Examining RPM package Files
14. Accessing Linux file systems
    a. Identifying file systems and devices
    b. Mounting and unmounting file systems
    c. Making links between files
    d. Locating files on the system
15. Using virtualized systems
    a. Managing a local virtualization host
    b. Installing a new virtual machine
    c. Chapter Test: Using virtualized systems

Lab Outline

1. Accessing the graphical user interface
2. Accessing the command line
3. Managing files with shell expansion
4. Viewing and printing help documentation
5. Creating, viewing, and editing text files
6. Managing local Linux users and groups
7. Controlling access to files with Linux file system permissions
8. Monitoring and managing Linux processes
9. Controlling services and daemons
10. Configuring and securing OpenSSH service
11. Analyzing and storing logs
12. Managing Red Hat Enterprise Linux networking

13. Archiving and copying files between systems
14. Installing and updating software packages
15. Accessing Linux file systems

Delivery Methods

Delivery Method: Please list all that apply -Face to face -Online (purely online no face-to-face contact) -Online with some required face-to-face meetings (“Hybrid”) -Online course with on ground testing -iTV – Interactive video = Face to face course with significant required activities in a distance modality -Other

- Face to face
- Online (purely online no face-to-face contact)
- Online with some required face-to-face meetings (“Hybrid”)

Rigor Statement: Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used. For instance, if labs, field trips, or site visits are required in the face to face section of this course, how will these requirements be met with the same rigor in the Distance Education section? Describe the ways in which instructor-student contact and student-student contact will be facilitated in the distance ed environments.

All assignments in distance education courses (online, hybrid and iTV) of IT C290 are of the same rigor as those in the on-ground course, except that students in purely online sections will submit all of their assignments virtually. The use of industry-standard software and a simulation manual instructs students to complete a series of tasks and provides detailed documentation of their results to the instructor. The instructor reviews the student’s results and provides feedback to the students on skill development and selection of the correct methods. The instructor can view students’ step-by-step actions to provide feedback and guide their learning. The instructor does provide detailed feedback to students to guide their learning. Instructor evaluation of student work in distance education courses is the same as in the on-ground course, except that evaluation of student work in online is presented virtually. Instead of on-site lectures, hybrid and online courses use a variety of methods including, but not limited to videos, interactive simulations and written lecture notes. Students will interact weekly on topical discussions with a requirement to respond to their peers to encourage critical thinking and deeper level understanding.

Good practice requires both asynchronous and synchronous contact for effective contact. List the methods expected of all instructors teaching the course. -Learning Management System -Discussion Forums -Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV - Interactive Video -Other

- Discussion Forums
- Chat/Instant Messaging

Software and Equipment: What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

Students will be working within a virtual environment to prepare their assignment. Vmware and/or Virtual Box will be used for these assignments. Partnerships with VMware provide students free use of their software.

Accessibility: Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden". I am using -iTV—Interactive Video only -Learning management system -Publisher course with learning management system interface.

- Learning management system

Class Size: Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

The class size online is set to 45. On-ground sections will be limited to 30 students due to limitation on room size and equipment to perform the hands-on exercises.