Cerro Coso College

Course Outline of Record Report

10/12/2021

ITC292 : Linux System Administration II

General Information

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Course Code (CB01) :	ITC292
Course Title (CB02) :	Linux System Administration II
Department:	Business Information Technolog
Proposal Start:	Spring 2021
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 the second in the series and builds on the information learned in IT C290, including a continuation of in-depth examination and configuration of common network service clients on Linux servers, to include automated installation with kickstart, task scheduling, configuration of NFS and SMB networking storage, and configuration of centralized authentication and enhanced security. Students will learn in the Red Hat Academy to secure and connect the Linux workstation to a corporate network.
Submission Type:	The IT/Cyber Security Advisory Committee has continually requested an operating system course/certificate with Linux as the need continues to grow. 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)

No value

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

ITC290 - Red Hat Administration I

Students need to have a core understanding of the basic setup of the Linux operating system including using the command line interface, graphical user interface, setting up the operating environment, managing files, creating, viewing and editing text files, managing users and groups and interacting with the operating system. This material is covered in IT C290.

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 multiple-choice questions.

Methods of Instruction	Discussion
Rationale	Discussion: Students will critically discuss the topics from the weekly reading and simulations/lab exercises. The topics for discussion for the online or on-ground classes will be the same. Subjects for the discussion will include relevant topics to the reading material, weekly lab simulations, and projects. 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 simulations and activities 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. 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 are provided that include language to describe course concepts and further students 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 security concepts related to setting up a Linux operating system.).
C. Weekly application simulations assignments (Example: Configure automated Linux installations with kickstart)

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 if they understand the concepts responding both in the discussion area and in the grading area. 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.Lab/activities will be evaluated by reviewing the steps/scores studnt take through the labs to demonstrate compentency. Example: Configure automated Linux installations with kickstart
Tests	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 security function in Red Hat Linux Enterprise Edition.
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 system	Payload Media	June 13, 2019	13: 978-0-986273-9-0

Other Instructional Materials

Description	Red Hat Academy
Author	Red Hat
Citation	No value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

No value

CSLOs

Describe and configure Kernel-based Virtual Machine (KVM) virtualized hosts, and automated Linux installations with kickstart. Expected SLO Performance: 70.0

Describe and use advanced Linux file redirection and inter-process communication. Expected SLO Performance: 70.0

Configure Linux local and network storage services. Expected SLO Performance: 70.0

Configure Linux security with Security-Enhanced Linux. Expected SLO Performance: 70.0

Exhibit troubleshooting problem-solving skills and utilities to solve complex issues. Expected SLO Performance: 70.0

Outline

Course Outline

1. Automating installation with Kickstart
    a. Defining the Anaconda Kickstart system

    b. Deploying a new virtual system with Kickstart
    c. Chapter Test: Automating installation with Kickstart
2. Using regular expressions with grep
    a. Regular expressions fundamentals
    b. Matching text with grep
3. Creating and editing text files with vim
    a. The vim text editor
    b. Basic vim workflow
    c. Editing with vim
4. Scheduling future Linux tasks
    a. Scheduling one-time tasks with at
    b. Scheduling recurring jobs with cron
    c. Scheduling system cron Jobs
    d. Managing temporary files
5. Managing priority of Linux processes
    a. Process priority and "nice" concepts
    b. Using nice and renice to influence process priority
6. Controlling access to files with Access Control Lists (ACLs)
    a. POSIX Access Control Lists (ACLs)
    b. Securing files with ACLs
7. Managing SELinux Security
    a. Enabling and monitoring security-enhanced Linux (SELinux)
    b. Changing SELinux modes
    c. Changing SELinux contexts
    d. Changing SELinux booleans
    e. Troubleshooting SELinux
8. Connecting to network-defined users and Groups
    a. Using identity management services
9. Adding disks, partitions, and file fystems to a Linux fystem
    a. Adding partitions, file systems, and persistent mounts
    b. Managing swap space
10. Managing Logical Volume Management (LVM) storage
    a. Logical volume management concepts
    b. Managing logical volumes
    c. Extending logical volumes
11. Accessing Network Storage with Network File System (NFS)
    a. Mounting network storage with NFS
    b. Automounting network storage with NFS
12. Accessing network storage with SMB
    a. Accessing network storage with SMB
13. Controlling and troubleshooting the Red Hat Enterprise Linux boot process
    a. The Red Hat Enterprise Linux boot process
    b. Repairing common boot issues
    c. Repairing file system issues at boot
    d. Repairing boot loader issues
14. Limiting network communication with firewalld

a. Limiting network communication

Lab Outline

1. Installing a system using Kickstart
2. Using regular expressions and other process redirection tools
3. Managing priority of Linux processes and automating tasks
4. Controlling access to files with Access Control Lists (ACLs)
5. Managing security enhanced Linux (SELinux) security
6. Adding disks, partitions, and file systems to a Linux system
7. Managing Logical Volume Management (LVM) storage
8. Accessing network storage with Network File System (NFS)
9. Accessing network storage with SMB
10. Exploring network communication and troubleshooting

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 C292 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 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
- E-mail

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 using VMware/Virtual Box to perform tasking and homework. These are at no cost to the students due to a partnership with VMware. Virtual Box is also a free virtualization tool.

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.