Discipline: Computer Information Systems

Originator: James Cregg

RIVERSIDE COMMUNITY COLLEGE DISTRICT
INTEGRATED COURSE OUTLINE OF RECORD

COMPUTER INFORMATION SYSTEMS 21A

CIS-21A : Linux Operating System Administration

College: RIV
Lecture Hours: 54.000
Units: 3.00
Pass/No Pass
Letter Grade

Course Description

Prerequisite: None

Advisory: CIS-1A or CIS-27

Course Credit Recommendation: Degree Credit

This course covers the fundamentals of the Linux operating system, system architecture, installation, command line functions, performance, and file systems. All major administrative responsibilities associated with this operating system are performed. These tasks shall include but not be limited to system installation, configuration, security, and backups for both client and server which might be found in a small business environment. This course aligns with the Linux Professional, LPI.org LPIC-1 Certification exam. 54 hours lecture. (Letter Grade, or Pass/No Pass option.)

Short Description for Class Schedule

This course covers the fundamentals of the Linux operating system, system architecture, installation, command line and file systems. The goal of this course is to help students prepare for the Linux Professional Institute, LPI.org, and first certification exam.

Entrance Skills:

Before entering the course, students should be able to demonstrate the following skills:

1. **Navigate file structures and utilize operating systems commands from at least one other OS.**
2. **Develop integrated reports based upon office applications such as documents, spreadsheets, presentation software and databases.**
3. **Understand the terminology associated with the computer information field.**
4. **Know the common hardware components and the software applications found in today's business environment.**
   - **CIS-27 -** Evaluate the need for the careful design of a secure organizational information infrastructure.

Student Learning Outcomes:

Upon successful completion of the course, students should be able to demonstrate the following skills:

1. **Describe the overall role the administrator in relation to the Linux operating system.**
   - **Information Competency & Technology Literacy:** Students will be able to use technology to locate, organize, and evaluate information. They will be able to locate relevant information, judge the reliability of sources, and evaluate the evidence contained in those sources as they construct arguments, make decisions, and solve problems.

2. **Install the Linux operating system on desktops and servers.**
   - **Information Competency & Technology Literacy:** Students will be able to use technology to locate, organize, and evaluate information. They will be able to locate relevant information, judge the reliability of sources, and evaluate the evidence contained in those sources as they construct arguments, make decisions, and solve problems.

3. **Identify and perform all system administrator responsibilities.**
   - **Critical Thinking:** Students will be able to demonstrate higher-order thinking skills about issues, problems, and explanations for which multiple solutions are possible. Students will be able to explore problems and, where possible, solve them. Students will be able to develop, test, and evaluate rival hypotheses. Students will be able to construct sound arguments and evaluate the arguments of others.

4. **Perform maintenance of business systems for update, security and backups.**
   - **Information Competency & Technology Literacy:** Students will be able to use technology to locate, organize, and evaluate information. They will be able to locate relevant information, judge the reliability of sources, and evaluate the evidence contained in those sources as they construct arguments, make decisions, and solve problems.

5. **Relate operating system theory to the installation and maintenance of Linux in the business environment.**
   - **Communication Skills:** Students will be able to communicate effectively in diverse situations. They will be able to create, express, and interpret meaning in oral, visual, and written forms. They will also be able to demonstrate quantitative literacy and the ability to use graphical, symbolic, and numerical methods to analyze, organize, and interpret data.

General Education Outcomes:

- **District General Education -** A2 Language and Rationality - Communication & Analytical Thinking

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Course Content:

1. This course is to correlate the theory behind operating systems with a specific implementation associated with Linux.
   a. Provide the students with the tools necessary to administer the Linux operating system in a small business environment.
   b. The installation and maintenance of Linux and it's applications on the desktop.
2. Installation of Linux on the desktop and server.
   a. Students will have an understanding of the hardware required that involves research into drivers for the installation process.
   b. Choosing the services to install. This requires an analysis of the delineation between the desktop and server for the office environment.
3. Setting up users and their responsibilities.
   a. Usernames, passwords, expiration dates, shells, groups and applications should be determined to minimize the amount of future security concerns.
   b. Deciding how to use groups and selecting strong passwords.
   c. Using groups to control who can access particular files.
4. Preform maintenance by checking logs for utilization and security, updating applications.
   a. Installing new applications, stopping and starting services, and backing up important data.
   b. Scan log files, kernel ring buffer, and use logical operators.
5. Configuring the shell.
   a. Working on the command line interface.
   b. Logging into a text-mode console.
6. Finding files, file management.
   a. Process basic file management.
   b. Find system files and place files in the correct location.
7. Standard text streams and redirection.
   a. Using streams, pipes and redirects.
8. Managing processes.
   a. Create, monitor and kill processes.
   b. Modify processes execution priorities.
9. Define the hardware boot process, bootloaders, and run levels.
   a. Determine and configure hardware settings.
   b. Boot the system.
   c. Install boot manager.
   d. Change run levels and shutdown or reboot systems.
10. Designing a scheme, creating partitions, and mounting file systems.
    a. Design hard disk layout.
    b. Create partitions and file systems.
    c. Control mounting and unmounting of the file system.
    d. Manage disk quotas.
    e. Manage shared libraries.

Methods of Instruction:

Methods of instruction used to achieve student learning outcomes may include, but are not limited to, the following activities:

- Present class lectures/discussions/demonstrations on Linux system requirements in order to prepare student to administrate Linux servers.

- Create group activities such as group projects, in order to familiarize the student with creating users,

groups, manage hardware, and getting to know the Linux server environment.

- Develop and assign class exercises such as weekly homework problems to learn more about what programs to use in solving problems found in the Linux operation system. Linux provides several documentation resources for student to use. One of these is the *man* page system, which documents most text-mode commands, configuration files, and systems calls.

- Develop and assign tasks/activities such installing a number of Linux distributions or maintaining the small business office in remote locations.

- Create group activities to assist student in managing files, locating, and tools to use. The *grep* utility in particular makesuse of regular expressions, which provide a way to describe patterns that you might want to find in files or in the output of other programs.

Methods of Evaluation:

Students will be evaluated for progress in and/or mastery of student learning outcomes using methods of evaluation which may include, but are not limited to, the following activities:

- Written project reports which thoroughly document the maintenance of installing Linux in a small business office, especially with respect to the research involved.

- Class and individual skill assessment projects will take place to cover key areas of Linux administration and installation.

- Work with students on the class lab/homework projects that represent real world Linux computer maintenance departments.

- Students have access to a Linux virtual machine to practice, explore and use command Line entries.

- Multiple step-by-step labs/homework assignments, will provid a positive learning environment where students interact with the Linux operating system and build on their skills and knowledge as they progress.

Sample Assignments:

Outside-of-Class Reading Assignments

- Students will be assigned readings from the text book and from the Learning Modules on the web site.
- Every end of chapter section includes an ongoing Case Study which will be assigned.

Outside-of-Class Writing Assignments

- Student will complete an analysis of ongoing Case Studies from end of chapter exercise in the text book to apply operating systems principles
- Apply critical thinking to a Situation Analysis scenario given in the text book.

Other Outside-of-Class Assignments

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

Course Materials:

All materials used in this course will be periodically reviewed to ensure that they are appropriate for college level instruction. Possible texts include the following:

- Bresnahan, Christine, Smith, Roderic. *Linux Essentials.* 2nd Sybex, 2015.
- Blum, Richard, Bresnahan, Christine . *Linux Command Line and Shell Scripting Bible* . 3rd Wiley, 2013.
Nemeth, Snyder, Hein & Whaley. *Linux Administration Handbook.* 4th Prentice Hall , 2011.

Codes/Dates:

CB05 MOV Transfer Status: N/A (not in college inventory) (D)
CB05 NOR Transfer Status: N/A (not in college inventory) (D)
CB05 RIV Transfer Status: Non-Transferable (C)

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COR Rev Date: 12/08/2015