

SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

COMP 643

COURSE TITLE

LINUX SERVER TECHNOLOGIES

TYPE COURSE

NON-FEE

VOCATIONAL

CATALOG COURSE DESCRIPTION

This course includes the installation, configuration, and management of network services and roles on the Linux Server Operating System. Students will learn about server administration tools, configuring common Linux services, and managing network and server security. Students will be introduced to network and server monitoring and troubleshooting tools and practices. (FT)

LECTURE/LABORATORY HOURS

120

ADVISORY

Microcomputer Basics or equivalent.

RECOMMENDED SKILL LEVEL

Possess a 10th grade reading level; ability to communicate effectively in the English language; knowledge of math concepts at the 8th grade level and basic computer literacy.

INSTITUTIONAL STUDENT LEARNING OUTCOMES

1. Social Responsibility
SDCE students demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
2. Effective Communication
SDCE students demonstrate effective communication skills.

INSTITUTIONAL STUDENT LEARNING OUTCOMES (CONTINUED)

3. Critical Thinking
SDCE students critically process information, make decisions, and solve problems independently or cooperatively.
4. Personal and Professional Development
SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self-advocacy skills to cope with changing situations in their lives.

COURSE GOALS

1. Learn how to setup and configure server roles.
2. Learn how to manage system services using the command line interface.
3. Learn the use of shell scripts to automate and perform typical tasks.
4. Understand and manage server network configuration.
5. Understand and manage server security.
6. Understand and employ appropriate troubleshooting methodology.

COURSE OBJECTIVES

Upon successful completion of this course, students will be able to:

1. Demonstrate the installation and configuration of server roles on the Linux Operating System.
2. Demonstrate how to use a command line interface to manage system services.
3. Demonstrate how to automate and perform typical tasks using shell scripts.
4. Demonstrate how to modify the network configuration to provide client access.
5. Identify common security threats and apply appropriate mitigation techniques.
6. Analyze common server and network misconfigurations and effect appropriate corrections.

SECTION II

COURSE CONTENT AND SCOPE

1. Administration
 - 1.1. Shells
 - 1.1.1. Command line interface
 - 1.1.2. Running commands
 - 1.1.3. Command syntax
 - 1.2. Shell Scripts
 - 1.2.1. Common editors
 - 1.2.2. Executing scripts
 - 1.2.3. Shell variables
 - 1.3. Server applications
 - 1.3.1. Common types
 - 1.3.2. Server Installation
 - 1.3.3. Package groups
 - 1.3.4. Update packages

COURSE CONTENT AND SCOPE (CONTINUED)

- 1.4. Configuration
 - 1.4.1. Configuration files
 - 1.4.2. Default configuration
- 1.5. Services
 - 1.5.1. Init daemon
 - 1.5.2. Runlevels
 - 1.5.3. Systemd
 - 1.5.4. Common tasks
 - 1.5.5. Auditing services
- 1.6. Common administrative tasks
 - 1.6.1. Scheduling tasks
 - 1.6.2. Logging
 - 1.6.3. Backup operations
- 1.7. Remote Access
 - 1.7.1. SSH (secure shell) for remote login
 - 1.7.2. Remote execution
 - 1.7.3. Common commands
 - 1.7.4. Key-based authentication
- 2. Security
 - 2.1. Threats
 - 2.1.1. Types
 - 2.1.2. Mitigation
 - 2.2. Firewalls
 - 2.2.1. Concepts and use
 - 2.2.2. firewalld
 - 2.2.3. iptables
 - 2.3. Account and password policies
 - 2.3.1. Configuration
 - 2.3.2. Best practices
 - 2.3.3. Monitor and control
 - 2.3.4. PAM (Pluggable Authentication Module) authentication
 - 2.4. SELinux (Security Enhanced Linux)
 - 2.4.1. Concepts and use
 - 2.4.2. Configuration
 - 2.4.3. Command line tools
 - 2.5. SSL/TLS (Secure Sockets Layer/Transport Layer Security)
 - 2.5.1. Open SSL security issues
 - 2.5.2. Configuration files, tools, and utilities
 - 2.5.3. Certificates and keys
 - 2.6. CHROOT jail
- 3. Network Services and Roles
 - 3.1. DNS (Domain Name System) server
 - 3.1.1. How it works
 - 3.1.2. Basic DNS server configuration
 - 3.1.3. DNS zone configuration
 - 3.1.4. DNS zone maintenance
 - 3.1.5. DNS security

COURSE CONTENT AND SCOPE (CONTINUED)

- 3.2. Web Services
 - 3.2.1. How it works
 - 3.2.2. Types of web servers
 - 3.2.3. Installation
 - 3.2.4. Configuration
 - 3.2.5. Monitoring
 - 3.2.6. Modules
 - 3.2.7. Virtual hosts
 - 3.2.8. Securing
 - 3.2.9. Custom file access
- 3.3. FTP (File Transfer Protocol) server
 - 3.3.1. How it works
 - 3.3.2. Server installation
 - 3.3.3. Configuration
 - 3.3.4. Common tasks
 - 3.3.5. Configuring client
 - 3.3.6. Security
- 3.4. File server
 - 3.4.1. NFS (Network File System)
 - 3.4.2. SAMBA (Samba file and print services)
 - 3.4.3. Installation
 - 3.4.4. Configuration
 - 3.4.5. Security
 - 3.4.6. Client access
- 4. Network
 - 4.1. TCP-IP (Transmission Control Protocol/Internet Protocol)
 - 4.1.1. History
 - 4.1.2. Protocols
 - 4.1.3. Port numbers
 - 4.1.4. NAT/PAT (Network Address Translation/ Port Address Translation)
 - 4.1.5. DNS (Domain Name System)
 - 4.1.6. HTTP (Hypertext Transport Protocol)
 - 4.1.7. IP (Internet Protocol)
 - 4.1.8. Ethernet
 - 4.2. LAN and WAN (Local Area Networks/Wide Area Networks)
 - 4.2.1. Network topologies
 - 4.2.2. Routing
 - 4.2.3. Broadcast networks
 - 4.2.4. Networking devices and infrastructure
 - 4.3. Network Configuration
 - 4.3.1. Static and automatic
 - 4.3.2. Configuration
 - 4.3.3. Command line and graphical tools
- 5. Troubleshooting
 - 5.1. Methodology
 - 5.2. Tools and utilities

APPROPRIATE READINGS

Appropriate readings may include, but are not limited to, periodicals, magazines, instructor-written materials, manuals, instructor selected URLs, and publications related to the implementation of server operating systems.

WRITING ASSIGNMENTS

Appropriate writing assignments may include, but are not limited to, preparing text for an assigned project, documenting all laboratories and project work, and completing all written assigned reports.

OUTSIDE ASSIGNMENTS

Outside assignments may include, but are not limited to, reading texts and reference resources; research as needed to complete projects; and organizing and preparing written answers to assigned questions.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Assignments which demonstrate critical thinking may include, but are not limited to, analysis and evaluation of assigned text and reference resources, and utilize this analysis in classroom discussions, writing assignments, and in performing laboratory activities. Students must select appropriate methods and resources needed to complete laboratory assignments.

EVALUATION

A student's grade will be based on multiple measures of performance and will include evaluation of student's ability to:

1. Perform in a variety of activities and assignments related to the course objectives.
2. Complete written and practical examinations.
3. Contribute to class and group discussions.
4. Maintain attendance and punctuality per current policy.
5. Demonstrate ability to work independently and as a team member.
6. Demonstrate troubleshooting skills.

Upon successful completion of each course in the program, a Certificate of Course Completion will be issued. Upon successful completion of all courses included in the program, a Certificate of Program Completion will be issued.

METHOD OF INSTRUCTION

Methods of instruction may include, but are not limited to, lectures, self-paced lab, demonstrations, individualized study, use of audio-visual aids, group/team work, tutorials, outside assignments, guest lectures, field trips, and guided student job assignments. This course, or sections of this course, may be offered through distance education.

TEXTS AND SUPPLIES

Linux Bible 2012, Christopher Negus, John Wiley & Sons, Inc., current edition
Linux+ Guide to Linux Certification, Jason Eckert, Course Technology, Cengage Learning, current edition

Web Resources: http://docs.fedoraproject.org/en-US/Fedora/18/html/System_Administrators_Guide/index.html;
<http://httpd.apache.org/>; <http://docstore.mik.ua/orelly/unix/upt/index.htm>

Supplies: Journal (composition book), USB Drive or other storage media

PREPARED BY: Richard Gholson DATE: 03/23/2015

REVISED BY: _____ DATE: _____

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administrative Due Process), and the Attendance Policy set forth in the Continuing Education Catalog.

REFERENCES:

San Diego Community College District Policy 3100
California Community Colleges, Title 5, Section 55002
Continuing Education Catalog