

I. CATALOG INFORMATION

A. Discipline: COMPUTER NETWORKING SYSTEMS ENGINEERING (CNSE)

B. Subject Code and Number: CNSE M55

C. Course Title: Linux Networking and System Administration

D. Credit Course units:

Units: 3

Lecture Hours per week: 2

Lab Hours per week : 3

Variable Units : No

E. Student Learning Hours:

Lecture Hours:

Classroom hours: 35 - 35

Laboratory/Activity Hours:

Laboratory/Activity Hours 52.5 - 52.5

Total Combined Hours in a 17.5 week term: 87.5 - 87.5

F. Non-Credit Course hours per week _____

G. May be taken a total of: 1 2 3 4 time(s) for credit

H. Is the course co-designated (same as) another course: No Yes

If YES, designate course Subject Code & Number: _____

I. Course Description:

Teaches the knowledge and skills needed to install, configure, operate, and manage the Linux operating system. Covers topics in Linux system and network administration, Linux network services, Linux Internet services, Linux system maintenance, and security and problem solving.

J. Entrance Skills

*Prerequisite: No Yes Course(s)

*Corequisite: No Yes Course(s)

Limitation on Enrollment: No Yes

Recommended Preparation: No Yes Course(s)

User level experience with any computer system, including use of mouse, use of menus and use of any graphical user interface.

Other: No Yes

K. Other Catalog Information:

Prepares students for CompTia Linux+ certification examination.

II. COURSE OBJECTIVES

Upon successful completion of the course, a student will be able to:

		Methods of evaluation will be consistent with, but not limited by, the following types or examples.
1	identify the duties of a Linux system administrator.	Midterm Final exam
2	plan and implement security.	Graded student demonstration Midterm Final exam
3	install Linux.	Graded student demonstration Midterm Final exam
4	use file system commands.	Graded student demonstration Midterm Final exam
5	examine the network configuration files.	Graded student demonstration
6	configure Dynamic Host configuration protocol (DHCP) and a Point-to-Point Protocol (PPP) connection.	Graded student demonstration
7	configure Network File System (NFS) server and client and Network Attached Storage (NAS) and Storage Area Network (SAN).	Graded student demonstration Midterm Final exam
8	configure Network Information System (NIS) server and client.	Graded student demonstration Midterm Final exam
		Graded student

9	install and configure the Samba server and client.	demonstration
10	describe AppleTalk addressing.	Midterm Final exam
11	identify Linux secure Internet services and less secure services.	Graded student demonstration Midterm Final exam
12	examine Domain Name Service (DNS) server configuration files.	Midterm Final exam
13	configure File Transfer Protocol (FTP) services.	Midterm Final exam
14	configure mail services.	Midterm Final exam
15	configure a web server.	Midterm Final exam
16	use Linux to access Internet and update Linux system.	Midterm Final exam
17	build a new kernel.	Midterm Final exam
18	demonstrate how to administer users and group accounts.	Graded student demonstration Midterm Final exam
19	use scripts to automate backups.	Midterm Final exam
20	demonstrate how to monitor running processes, memory utilization, disk usage and performance, and identify server board components.	Graded student demonstration Midterm Final exam

21	demonstrate various operations with users and groups.	Graded student demonstration Midterm Final exam
22	use Linux backup tools.	Midterm Final exam
23	use Package Manager to update system.	Graded student demonstration Midterm Final exam
24	find security-related resources.	Graded student demonstration
25	demonstrate how to maintain user and password security.	Graded student demonstration
26	demonstrate how to limit network services.	Graded student demonstration Midterm Final exam
27	use Tripwire to detect intrusion.	Midterm Final exam
28	troubleshoot basic Linux installation problems including Redundant Array of Independent Disks (Raid) and server software.	Midterm Final exam

III. COURSE CONTENT

Estimated %	Topic	Learning Outcomes
Lecture (must total 100%)		
3.00%	Duties of the System Administrator	1
3.00%	The Network Information System	8
3.00%	Connecting to Microsoft Networks	9
3.00%	Connecting to Apple Networks	10
3.00%	What are Internet Services?	11
4.00%	The Domain Name System	12
4.00%	Configuring FTP Services	13
4.00%	Configuring Mail Services	14

3.00%	Configuring a Web Server	15
3.00%	Using the Red Hat Network	16
3.00%	Upgrading and Customizing the Kernel	17
3.00%	Configuring the System on the Command Line	18
4.00%	Using Scripts to Automate Tasks	19
4.00%	Administering Users and Groups	21
4.00%	Installing and Upgrading Software Packages	23
3.00%	Security Basics	24
4.00%	Implementing Local Security	25
4.00%	Firewalls and Internet Security	26
4.00%	Detecting Intrusions	27
3.00%	Planning the Network and examine network architectures while implementing best practices.	2
4.00%	Best practices installing Red Hat Linux and examine server types and functions.	3
4.00%	Red Hat Linux File System and server software.	4
4.00%	Red Hat System Configuration Files and system management features.	5
4.00%	Transmission Control Protocol/Internet Protocol (TCP/IP) Networking	6
3.00%	Network essentials for servers.	7
4.00%	Performance Monitoring and memory usage.	20
4.00%	Backing up and Restoring the File System using Storage Area Networks and Network Attached Storage, and other server storage systems.	22
4.00%	Troubleshooting and Problem Solving , including cooling, power distribution, and best practices.	28

IV. TYPICAL ASSIGNMENTS

A. Writing assignments

Writing assignments are required. Possible assignments may include, but are not limited to:	
1	write short answers to class assignments on topics such as Linux distributions or versions.
2	write a short essay describing the use of the command line for administering Linux.

B. Appropriate outside assignments

Appropriate outside assignments are required. Possible assignments may include, but are not limited to:	
1	research a topic related to the course, such as what are the newer advancements in the Linux systems.
2	complete assigned exercises on such topics as the configuring of specific applications such as a Linux webserver.

C. Critical thinking assignments

Critical thinking assignments are required. Possible assignments may include, but are not

limited to:	
1	compare and contrast strategies for hardening a Linux System.
2	solve lab scenarios to meet business requirements, such as backing up and clustering a Linux machine.
3	assess various best practices in managing and administering Linux.

V. METHODS OF INSTRUCTION

Methods of instruction may include, but are not limited to:

- Distance Education – When any portion of class contact hours is replaced by distance education delivery mode (Complete DE Addendum, Section XV)
- Lecture/Discussion
- Laboratory/Activity
- Other (Specify) Supplementary online materials
Assigned Internet research
- Optional Field Trips
- Required Field Trips

VI. METHODS OF EVALUATION

Methods of evaluation may include, but are not limited to:

- Essay Exam
- Classroom Discussion
- Skill Demonstration
- Problem Solving Exam
- Reports/Papers/Journals
- Participation
- Objective Exams
- Projects
- Other (specify)

Assess troubleshooting skills in a lab environment

VII. REPRESENTATIVE TEXTS AND OTHER COURSE MATERIALS

Nemeth, Evi, et al. Unix andn Linus System Administration Handbook. 5th ed. Addison-Wesley, 2017.

Cannon, Jason. Linux Administration: The Linux Operating System and Command Line Guide for Linux Administrators. Linuxtrainingacademy.com, 2016.

VIII. STUDENT MATERIALS FEES

- No Yes

IX. PARALLEL COURSES

College	Course Number	Course Title	Units
Mt. San Antonio College	CISN 31 & 31L	Linux Operating System and Lab	3 & 0.5

De Anza College	CIS 73	UNIX/LINUX Systems Programming	4.5
Ohlone College	CNET 140	Linux System Administration I (LPI-1)	4

X. MINIMUM QUALIFICATIONS

Courses Requiring a Masters Degree:
 Associate Degree + 6 years networking experience or Associate Degree + 2 years networking experience and Linux certification

XI. ARTICULATION INFORMATION

A. Title V Course Classification:

1. This course is designed to be taken either:

- Pass/No Pass only (no letter grade possible); or
- Letter grade (P/NP possible at student option)

2. Degree status:

Either Associate Degree Applicable; or Non-associate Degree Applicable

B. Moorpark College General Education:

1. Do you recommend this course for inclusion on the Associate Degree General Education list?

Yes: No: If YES, what section(s)?

- A1 - Natural Sciences - Biological Science
- A2 - Natural Sciences - Physical Science
- B1 - Social and Behavioral Sciences - American History/Institutions
- B2 - Social and Behavioral Sciences - Other Social Behavioral Science
- C1 - Humanities - Fine or Performing Arts
- C2 - Humanities - Other Humanities
- D1 - Language and Rationality - English Composition
- D2 - Language and Rationality - Communication and Analytical Thinking
- E1 - Health/Physical Education
- E2 - PE or Dance
- F - Ethnic/Gender Studies

C. California State University(CSU) Articulation:

1. Do you recommend this course for transfer credit to CSU? Yes: No:

2. If YES do you recommend this course for inclusion on the CSU General Education list?

Yes: No: If YES, which area(s)?

- A1
- A2
- A3
- B1
- B2
- B3
- B4
- C1
- C2
- D1
- D2
- D3
- D4
- D5
- D6
- D7
- D8
- D9
- D10
- E

D. University of California (UC) Articulation:

1. Do you recommend this course for transfer to the UC? Yes: No:
2. If YES do you recommend this course for the Intersegmental General Education Transfer Curriculum (IGETC)? Yes: No:

IGETC Area 1: English Communication

- English Composition
- Critical Thinking-English Composition
- Oral Communication

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

- Mathematical Concepts

IGETC Area 3: Arts and Humanities

- Arts
- Humanities

IGETC Area 4: Social and Behavioral Sciences

- Anthropology and Archaeology
- Economics
- Ethnic Studies
- Gender Studies
- Geography
- History
- Interdisciplinary, Social & Behavioral Sciences
- Political Science, Government & Legal Institutions
- Psychology
- Sociology & Criminology

IGETC Area 5: Physical and Biological Sciences (mark all that apply)

- Physical Science Lab or Physical Science Lab only (non-sequence)
- Physical Science Lecture only (non-sequence)
- Biological Science
- Physical Science Courses
- Physical Science Lab or Biological Science Lab Only (non-sequence)
- Biological Science Courses
- Biological Science Lab course
- First Science course in a Special sequence
- Second Science course in a Special Sequence
- Laboratory Activity
-

Physical Sciences

IGETC Area 6: Language other than English

Languages other than English (UC Requirement Only)

U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)

U.S. History, Constitution, and American Ideals (CSU Requirement ONLY)

XII. REVIEW OF LIBRARY RESOURCES

A. What planned assignment(s) will require library resources and use?

The following assignments require library resources:

Research, using the Library's print and online resources, for a topic such as Linux distributions.

B. Are the currently held library resources sufficient to support the course assignment?

YES: NO:

If NO, please list additional library resources needed to support this course.

XIII. PREREQUISITE AND/OR COREQUISITE JUSTIFICATION

CNSE M55: Not Applicable

XIV. WORKPLACE PREPARATION

Required for career technical courses only. A career technical course/program is one with the primary goal to prepare students for employment immediately upon course/program completion, and/or upgrading employment skills.

Detail how the course meets the Secretary of Labors Commission on the Achievement of Necessary Skills (SCANS) areas. (For a description of the competencies and skills with a listing of what students should be able to do, go to:

<http://www.ncrel.org/sdrs/areas/issues/methods/assment/as7scans.htm>)

The course will address the SCANS competency areas:

1. Resources: the students will learn to configure Linux systems to support business environments while using an engineering journal.
2. Interpersonal: the students will be required to participate in group problem solving activities.
3. Information: the students will acquire and use information through a variety of assignments, network technology tools, and computer software used in computer network systems; for example, use tools provided by Linux administration websites and tools provided by the operating system vendors.
4. Systems: the students will employ a variety of computer tools to complete projects or assess computer networking problems.
5. Technology: the students will use modern technology to acquire the skills needed to prepare for a career.

The course also addresses the SCANS skills and personal qualities:

1. **Basic Skills:** the students will read, perform computer mathematical operations, listen and respond to weekly assignments, and participate in classroom discussions.
2. **Thinking Skills:** the students will think creatively and make decisions in order to solve computer network problems and demonstrate reasonable problem solving skills.
3. **Personal Qualities:** the students will be required to display responsibility, self-management, integrity, and honesty throughout course work and classroom exercises.

XV. DISTANCE LEARNING COURSE OUTLINE ADDENDUM

1. Mode of Delivery

- Online (course will be delivered 100% online)
- Online with onsite examinations (100% of the instruction will occur online, but examinations and an orientation will be scheduled onsite)
- Online/Hybrid (a percentage of instruction will be held online and the remaining percentage of instruction will be held onsite)
 - Lab activities will be conducted onsite
- Televideo (Examinations and an orientation will be held onsite)
- Teleconference
- Other Use of CTE Netlabs Online curriculum and simulator or use of Testout.com and its simulation tools.

2. Need/Justification

CNSE is part of South Central Coast Regional Consortium (SCCRC) which received 300K in Online Lab funding to support curriculum offerings using the NetLabs environment based on "Best Practices". Moorpark is part of this cooperative to help improve Career Technical Education student access.

3. Describe how instructors teaching this course will ensure regular, effective contact with and among students.

Online instructors will provide lesson modules that require activities such as reading course materials, and participating in discussion forums or chat room topics. Instructors may also meet with students for study sessions and online office hours using an online communication tool. Instructors will provide students with feedback on the content and quality of Lab assignments and discussion posts. Additionally, instructors may engage students using the following communication activities available in the online classroom: contact students via e-mail within the course shell, by campus e-mail, and/or MyVCCCD; use the "announcement" tool to remind students of important assignments and due dates; provide students with an online schedule of class events using the "calendar" tool in the online course shell.

4. Describe how instructors teaching this course will involve students in active learning.

Instructors may involve students in active learning with the following activities: students may view video lessons and/or text-based lessons corresponding to course content and learning objectives; students may complete homework through the online course, and/or using an interactive online simulator provided 3rd party; students may engage in internet searches on topics corresponding to course content and learning objectives; students may test their knowledge with interactive online quizzes; students may interact with the instructor and classmates using an online discussion forum to ask questions; students may submit questions to the instructor by email or ask in person in a virtual classroom; instructor may create student groups or group activities using the online course.

5. Explain how instructors teaching this course will provide multiple methods of content representation.

The following represent the methods by which content may be provided for learning: instructional videos; textbook and professional guides; links to online resources that may include videos, quizzes, text explanations documents; homework assignments; Lab configuration scenarios.

6. Describe how instructors teaching this course will evaluate student performance.

Students may take objective and essay exams in an online teaching environment. Students may be required to do the following assignments: complete writing assignments focused on application of course content; develop, implement, and evaluate Lab scenarios projects; complete regular online quizzes; complete written assignments related to key course concepts; participate in online discussion forums.

XVI. GENERAL EDUCATION COURSE OUTLINE ADDENDUM

CNSE M55: Not Applicable

XVII. STUDENT MATERIALS FEE ADDENDUM

CNSE M55: Not Applicable

XVIII. REPEATABILITY JUSTIFICATION TITLE 5, SECTION 55041

CNSE M55: Not Applicable

XIX. CURRICULUM APPROVAL

Course Information:

Discipline:

COMPUTER NETWORKING SYSTEMS ENGINEERING (CNSE)

Discipline Code and Number: CNSE M55

Course Revision Category: Outline Update

Course Proposed By:

Originating Faculty Edmond Garcia 08/25/2017

Faculty Peer: Edmond Garcia 08/25/2017

Curriculum Rep: _____

Department Chair: Navreet Sumal 09/02/2017

Division Dean: Howard Davis 08/28/2017

Approved By:

Curriculum Chair: Jerry Mansfield 10/13/2017

Executive Vice President: Julius Sokenu 10/13/2017

Articulation Officer: Letrisha Mai 09/21/2017

Librarian: Mary LaBarge 09/20/2017

Implementation Term and Year: _____

Approval Dates:

Approved by Moorpark College Curriculum Committee: 10/03/2017

Approved by Board of Trustees (if applicable): 12/12/2017

Approved by State (if applicable): 01/12/2018