Northern Marianas College
CURRICULUM ACTION REQUEST

Course: CS221 Linux Operating System Fundamentals

Effective Semester / Session: FALL 2025

Type of Action:

X	New
___	Modification
___	Move to Inactive (Stop Out)
___	Cancellation

Course Alpha and Number: CS221

Course Title: Linux Operating System Fundamentals

Reason for initiating, revising, or canceling:
This course guide is being created to introduce students to the fundamentals of the Linux operating system using the Cengage MindTap curriculum "CompTIA Linux+ Guide to Linux Certification," is designed to equip learners with essential industry standard skills in installation, command-line operations, system administration, and basic security practices. This course will be paired with Linux+ Comptia Certification.

Michael Rodgers Jr. Michael D Rodgers (Mar 19, 2025 15:00 GMT+10) 03/19/2025

Proposer Date

Barbara C. Hunter Barbara Hunter (Mar 19, 2025 15:21 GMT+10) 03/19/2025

Academic Unit Head Date

Adam Walsh

Language & Format Review Specialist Date

Yunzi Zhang Yunzi Zhang (Mar 19, 2025 15:39 GMT+10) 03/19/2025

Academic Council Chair Date

Lorraine C. Maui Lorraine Maui (Mar 19, 2025 16:23 GMT+10) 03/19/2025

Interim Dean of Academic Programs & Services Date

1. **Department**
   School of Business

2. **Purpose**
   This course introduces students to the Linux operating system with a focus on hands-on learning. Students will explore Linux distributions, learn command-line operations, manage file systems, and perform basic system administration tasks. This course is essential for students pursuing careers in Computer Science and Information Technology. This course will be paired with Linux+ Comptia Certification at the conclusion of the course.

3. **Description**

   A. Required/Recommended Textbook(s) and Related Materials
   Required:
   CompTIA Linux+ Guide to Linux Certification, the Latest Edition. by Jason Eckert
   Guide to Linux Certification, Sixth Edition. by Cengage. ISBN: 97982140009

   Recommended: None

   B. Contact Hours
   1. **Lecture:** 3 per week / 45 per semester
   2. **Lab:** None
   3. **Other:** None

   C. Credits
   1. **Number:** 3
   2. **Type:** Regular Degree Credits

   D. Catalog Course Description
   This course provides an introduction to the Linux operating system, emphasizing command-line proficiency, file system management, and basic system administration. Through lectures and lab exercises, students learn how to install and configure Linux, manage users and processes, and apply fundamental security practices. Prerequisite**:** Basic computer literacy or CS103. English Placement Level**:** EN095; Mathematics Placement Level**:** MA132. (Offered in Fall)

   E. Degree or Certificate Requirements Met by Course
   This course is a required component for the A.A.S. degree in Computer Science and the Certificate of Completion in Information Technology.

   F. Course Activities and Design
   This course combines lecture instruction with extensive hands-on lab sessions and project-based learning. Students will engage in practical exercises such as

installing Linux, navigating the command-line interface, managing system resources, and performing routine administration tasks. Lab sessions are designed to reinforce lecture material and provide real-world experience.

4. **Course Prerequisite(s); Concurrent Course Enrollment**
   Prerequisites: CS103
   Concurrent Course Enrollment: None

   Required English/Mathematics Proficiency Level(s)
   English Placement Level: EN095
   Mathematics Placement Level: MA132

5. **Estimated Cost of Course; Instructional Resources Needed**
   Cost to the Student: Tuition for a 3-credit course and the cost of the textbook. Comptia Certification Exam at Course Conclusion (optional), a current Linux distribution (e.g. Ubuntu, CentOS) installed on a personal computer or via a virtual machine, terminal access (or a terminal emulator), USB flash drive for backup (2GB or higher), internet access for software updates and online resources, course Exam fee for Linux+ Comptia Certification.

   Cost to the College: Instructor's salary and lab equipment.

   Instructional resources needed for this course include: a current Linux distribution (e.g. Ubuntu, CentOS) and internet access for software updates and online resources.

6. **Method of Evaluation**
   Student performance will be assessed through tests and quizzes, lab assignments, practical project work, attendance, and class participation. Northern Marianas College's grading and attendance policies will be followed.

7. Course Outline

This is a topical outline and does not necessarily indicate the sequence in which the material will be presented.

1.0 Introduction to Linux & Its History
- 1.1 Overview of Linux and open-source philosophy
- 1.2 Evolution of Linux distributions

2.0 Linux Distributions Overview
- 2.1 Comparison of major Linux distributions
- 2.2 Understanding use-case differences

3.0 Installation Procedures & Initial Configuration
- 3.1 Installing a Linux distribution (e.g. Ubuntu or CentOS)
- 3.2 Basic system setup and initial configuration

4.0 Linux File System Structure
- 4.1 Understanding the directory hierarchy
- 4.2 Basic file management commands

5.0 Command-Line Fundamentals
- 5.1 Navigating the Linux terminal
- 5.2 Essential commands (e.g. ls, cd, pwd)
- 5.3 Advanced command usage and utilities
- 5.4 Using manual pages and help tools

6.0 File Permissions & Ownership
- 6.1 Understanding Linux file permissions (rwx)
- 6.2 Changing permissions and ownership with chmod/chown

7.0 Process Management
- 7.1 Viewing and managing running processes
- 7.2 Command for process control (ps, top, kill)

8.0 Package Management & Software Installation
- 8.1 Using package managers (apt, yum, etc.)
- 8.2 Installing, updating, and maintaining software

9.0 User & Group Management
- 9.1 Creating and managing user accounts
- 9.2 Configuring groups and setting permissions

10.0 Introduction to Shell Scripting
- 10.1 Fundamentals of shell scripting

- 10.2 Writing and executing simple scripts
- 10.3 Using various, loops, and conditionals
- 10.4 Automating routine tasks with scripts

11. 0 Network Configuration & Troubleshooting
- 11.1 Configuring network interfaces
- 11.2 Basics of IP addressing and subnetting
- 11.3 Troubleshooting network connectivity (ping, traceroute)
- 11.4 Configuring DNS and basic routing concepts

12. 0 Fundamentals of Linux System Security
- 12.1 Security best practices for Linux systems
- 12.2 Implementing firewall rules and access controls (iptables, ufw)

13. 0 Practical Lab Projects & Final Presentations
- 13.1 Integration of course concepts through hands-on projects
- 13.2 Final project presentations and course wrap-up

8. Instructional Goals

The course will introduce students to:

1.0 Install and configure Linux operating systems;

2.0 Develop proficiency with the Linux command line and file management;

3.0 Perform basic system administration tasks, including user and process management; and

4.0 Understand and implement foundational security practices in Linux.

9. Student Learning Outcomes

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

1.0 Setup a Linux distribution on a computer or virtual machine;

2.0 Navigate the Linux file system and use command-line tools effectively;

3.0 Manage users, groups, processes, and permissions;

4.0 Utilize package management tools to install and update software;

5.0 Write and execute basic shell scripts for task automation;

6.0 Apply security best practices to secure a Linux environment; and

7.0 Demonstrate troubleshooting and system maintenance skills.

10. Assessment Measures of Student Learning Outcomes

Assessment of student learning may include, but not be limited to, the following:

1.0 Tests & Quizzes;

2.0 Lab Assignments & Exercise;

3.0 Practical Project Assignments; and

4.0 Attendance & Class Participation.