

**HOSTOS COMMUNITY COLLEGE  
DEPARTMENT OF MATHEMATICS  
AND COMPUTER SCIENCE**

**COURSE: CST 160 OPERATING SYSTEMS FUNDAMENTALS**

**Credit Hours: 3.0**

**Lab Hours: 2.0**

**Class Hours: 2.0**

**Prerequisite:** CSC 140

**Course Description:**

This course is designed to introduce the student to the basic concepts and structures of operating systems, and how computer operating systems allocate resources. Its goal is to provide a basic working knowledge of computer operating system commands, functions, and management approaches using the DOS, Windows, Linux, and UNIX operating environments. Topics include memory management, process management, device management, file management, and operating system tools. The course introduces command structures and explores operations using GUI and Command Language Interfaces for Windows and Linux.

**Required Materials:**

Ida Flynn and McHoes, Understanding Operating Systems (3rd-8th edition.), Course Technology, ISBN-13: 978-1-4239-0160-0

Students are required to have a flash drive for storage.

**Course Objectives:**

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

1. Describe the basic role of the operating system.
2. Identify the differences between the batch, interactive, real-time, hybrid, and embedded operating systems.
3. Identify the basic functionality of the three memory allocation schemes.
4. Identify the paged, demand paging, segmented, and segmented/demand paged allocation schemes.
5. Identify the difference between job scheduling and process scheduling.
6. Identify deadlock, starvations, and race.
7. Identify the features of dedicated, shared, and virtual devices.
8. Identify the differences between sequential and direct access media.

9. Identify the role of data compression in file storage and compare sequential and direct file access.
10. Identify the advantages and disadvantages of contiguous, noncontiguous, and indexed file storage techniques.
11. Identify the roles of system measurement tools such as positive and negative feedback loops.
12. Identify system monitoring techniques.
13. Identify the advantages and disadvantages of MS-DOS, including basic commands.
14. Demonstrate proficiency with the OS Command Line of Windows and Linux, which includes the ability to edit, rename, copy, move, delete, and create files and directories and to navigate folders.
15. Create simple batch programs.
16. Identify the design goals of Windows operating systems.
17. Identify the use of the device, processor, and network managers in recent versions of Windows.
18. Identify the design goals for Windows vs. open-source operating systems
19. Identify the services provided by operating systems.
20. Solve problems involving process control, mutual exclusion, deadlock, and synchronization.
21. Identify the major components of an operating system and explain their functions individually,
22. Discuss the operating system features required for a particular target application,
23. Understand the various levels of system and application software,
24. Understand how design decisions in Operating Systems affect users of the system.
25. Compare and contrast features from different operating systems.
26. Describe processes of managing memory, processes, files, and devices.
27. Evaluate an operating system in terms of its efficiency and ease of use.
28. Create a bootable flash drive containing the Ubuntu Linux distribution
29. Demonstrate the ability to perform network diagnostics with the command prompt

### **Student Learning Outcomes:**

1. Students will demonstrate fluency in explaining the objectives and functions of modern operating systems.
2. Students will demonstrate fluency in describing how application software uses computing resources and how system software manages them.
3. Students will demonstrate fluency in describing the importance of concurrency in an operating system.
4. Students will demonstrate an understanding of simple memory management and virtual memory.
5. Students will explain file management, mass storage, input/output systems, and network managers in recent versions of Windows.
6. Students will demonstrate proficiency in manipulating files and folders with the OS Windows and Linux Command Line Interfaces.

### **Grading Procedure:**

Final Exam	30%
Mid Term Exam	20%
Homework & Labs	20%
Project	30%

**Course Outline:**

<b>Week</b>	<b>Topic</b>
1	<b>Chapter 1 – Introducing Operating Systems</b>
2	<b>Chapter 2: Memory Management – Early Systems</b>
3	<b>Chapter 3: Memory Management – Virtual Memory</b>
4	<b>Review and discussion; Exam 1</b>
5	<b>Chapter 4: Processor Management</b>
6	<b>Chapter 5 Process Management</b>
7	<b>Chapter 6 Concurrent Processes</b>
8	<b>Chapter 7: Device Management</b>
9	<b>Chapter 8: File Management</b>
10	<b>Chapter 9: Network Organization Concepts</b>
11-12	<b>Chapter 13 – UNIX/Linux Operating Systems</b>
13-14	<b>Chapter 14 – MS-DOS Operating System</b>
15	<b>Review for the Final exam, discussion; Final Exam</b>