

## Operating Systems

**Course title:** Operating Systems

**Course code:** CAS204

**Course Hours:** 3

**Knowledge Domain:** Computer Architecture and System Software.

**Prerequisite(s):** Automata Models (CAS205)

### Learning Objectives

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

1. Acquire the basic operating system concepts such as processes & threads.
2. Explain the Details of some units such as memory management, I/O, and File systems.
3. Illustrate the above concepts such as UNIX/LINUX and Windows by using two case studies.

### Learning Outcomes:

1. Grasping the basic concepts of operating systems together with the modules needed to manage the different computer resources.
2. Grasping two implementations of operating systems in reasonable detail together with hands-on experience.

### Overview and Syllabus

Introduction to operating systems. Processes and threads.

Deadlocks. Memory management. Input/ Output. File systems.

Case study (1): UNIX and LINUX. Case study (2): Windows.

### Course Outline

	<b>Topic</b>
1	<b><u>Module 01: Introduction to Operating System</u></b> Introduction Objectives <b>Lesson 01:</b> Computer System Overview <b>Lesson 02:</b> Computer System Organization <b>Lesson 03:</b> OS Defination History <b>Lesson 04:</b> Types Computer System <b>Lesson 05:</b> Operating System Services Summary

	Assessment
2	<p><b><u>Module 02: Operating System Structure</u></b></p> <p>Introduction</p> <p>Objectives</p> <p><b>Lesson 01:</b> Operating System Components</p> <p><b>Lesson 02:</b> Interrupt Handling</p> <p><b>Lesson 03:</b> Operating System Operation (Dual Mode Operation)</p> <p><b>Lesson 04:</b> System Call</p> <p><b>Lesson 05:</b> Operating System Design and Implementation</p> <p>Summary</p> <p>Assessment</p>
3	<p><b><u>Module 03: Process Management</u></b></p> <p>Introduction</p> <p>Objectives</p> <p><b>Lesson 01:</b> Process Concepts</p> <p><b>Lesson 02:</b> Operation on Process</p> <p><b>Lesson 03:</b> Process Management</p> <p><b>Lesson 04:</b> Threads</p> <p><b>Lesson 05:</b> Operating System Services</p> <p>Summary</p> <p>Assessment</p>
4	<p><b><u>Module 04: CPU Scheduling</u></b></p> <p>Introduction</p> <p>Objectives</p> <p><b>Lesson 01:</b> Basic Concepts</p> <p><b>Lesson 02:</b> Fundamental Scheduling Algorithms (FCFS)</p> <p><b>Lesson 03:</b> Fundamental Scheduling Algorithms (Round Robin)</p> <p><b>Lesson 04:</b> Fundamental Scheduling Algorithms(SJF &amp; priority)</p> <p><b>Lesson 05:</b> Advanced Scheduling Algorithms</p> <p>Summary</p> <p>Assessment</p>
5	<p><b><u>Module 05: Process Synchronization</u></b></p> <p>Introduction</p> <p>Objectives</p> <p><b>Lesson 01:</b> Introduction To Process Synchronization</p> <p><b>Lesson 02:</b> The Critical Section Problem</p> <p><b>Lesson 03:</b> Solution To The Critical Section Problem</p> <p><b>Lesson 04:</b> Hardware Solution</p> <p><b>Lesson 05:</b> Classical Problems Of Synchronization</p> <p>Summary</p>

	Assessment
6	<p><b><u>Module 06: Deadlock</u></b></p> <p>Introduction</p> <p>Objectives</p> <p><b>Lesson 01:</b> Introduction to Deadlock</p> <p><b>Lesson 02:</b> Characterization of Deadlock</p> <p><b>Lesson 03:</b> Method for Handling Deadlock</p> <p><b>Lesson 04:</b> Deadlocks Avoidance</p> <p><b>Lesson 05:</b> Deadlocks Detection and Recovery</p> <p>Summary</p> <p>Assessment</p>
7	<p><b><u>Module 07: Memory Management</u></b></p> <p>Introduction</p> <p>Objectives</p> <p><b>Lesson 01:</b> Introduction to Memory Management</p> <p><b>Lesson 02:</b> Memory Partitioning</p> <p><b>Lesson 03:</b> Paging</p> <p><b>Lesson 04:</b> Segmentation</p> <p>Summary</p> <p>Assessment</p>
8	<p><b><u>Module 08: Virtual Memory</u></b></p> <p>Introduction</p> <p>Objectives</p> <p><b>Lesson 01:</b> Introduction to Virtual Memory</p> <p><b>Lesson 02:</b> Demand Paging</p> <p><b>Lesson 03:</b> Page Replacement Algorithm</p> <p><b>Lesson 04:</b> Age Replacement Algorithm(Cont).</p> <p>Summary</p> <p>Assessment</p>
9	<p><b><u>Module 09: LINUX</u></b></p> <p>Introduction</p> <p>Objectives</p> <p><b>Lesson 01:</b> LINUX Overview</p> <p><b>Lesson 02:</b> Process Management</p> <p><b>Lesson 03:</b> Memory Management</p> <p><b>Lesson 04:</b> File System</p> <p>Summary</p> <p>Assessment</p>