COMSATS University Islamabad
Department of Computer Science
Course Description Form (CDF)

Course Information

Course Code: **CSC323**	Course Title: **Principles of Operating Systems**
Credit Hours: **4(3,1)**	Lecture Hours/Week: **3**
Lab Hours/Week: **3**	Pre-Requisites: **CSC211- Data Structures and Algorithms**

Catalogue Description:

This course introduces the services and functions performed by operating system for smooth and accurate system operations. Topics include: Operating Systems Overview; Device Organization & System Operations; Operating Systems Principles; Process Management; Process Synchronization; Deadlocks; Multiprocessor Issues; Memory Management; Storage Management; and Security & Protection.

Unit wise Major Topics:

Unit	Topic	No. of Teaching Hours
1.	Operating Systems: Overview, Purpose & Functionality, Evolution, Needs, Principles, Computing Environments; Device Organization & System Operations: Interrupts, Dual Mode Execution, Single & Multi User; Services & System Calls, Shell Management; and OS Structuring Techniques & Design Issues.	7.5
2.	Process Management: Concepts, States, Structures, Context Switching; Operations on Processes; IPC Issues; Threads: Parallelism & Concurrency; Scheduling & Dispatching: Types, and Algorithms;	12
3.	Process Synchronization: Primitives, Critical Section Problem & Solutions; Deadlocks: Characterization, and Handling.	9
4.	Memory Management: Physical Memory & Issues; Allocation Techniques: Contiguous & Non-Contiguous; Virtual Memory: Demand Paging, Working Sets, and Thrashing.	7.5
5.	Storage Management: Disk Management, Disk Scheduling, Disk Structure, Swap-Space Management, and File System & Implementation.	6
6.	Security & Protection: Overview, Significance, Policy/Mechanism Separation, Security Methods & Devices Protection, and Access Control & Authentication.	3
Total Contact Hours		**45**

Mapping of CLOs and SOs

Sr.#	Unit #	Course Learning Outcomes	Blooms Taxonomy Learning Level	SO
CLO's for Theory				
CLO-1	1	Elaborate concepts and principles of operating systems.	*Understanding*	1
CLO-2	2-3	Analyze various operations performed by operating system for process management.	*Analyzing*	1,2
CLO-3	4	Analyze the memory management issues and techniques in the context of operating system.	*Analyzing*	2

CLO-4	5	State the concepts of file system, storage and security issues.	*Understanding*	1
CLO's for Lab				
CLO-5	1	Operate basic services and functionality of operating systems.	*Applying*	1
CLO-6	1	Compose Linux commands using Shell scripting.	*Applying*	1,4
CLO-7	2-3	Implement the concepts of process management.	*Applying*	2,4

CLO Assessment Mechanism

Assessment Tools	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5	CLO-6	CLO-7
Quizzes	Quiz 1	Quiz 2	Quiz 3	Quiz 4	-	-	-
Assignments	Assignment 1	Assignment 2	Assignment 3	Assignment 4	LAB Assignment	LAB Assignment	LAB Assignment
Mid Term Exam	Mid Term Exam	Mid Term Exam	-	-	-	-	-
Final Term Exam	Final Exam				-		

Text and Reference Books

Textbooks:

1. Operating System Concepts, Silberschatz & Galvin, Addison-Wesley, 2021.
2. Modern Operating Systems, Tanenbaum, A. S., Prentice Hall, 2014.

Reference Book:

1. Operating Systems: Internals and Design Principles, Stallings, W., Pearson, 2017.