

Course Title:	Operating Systems
Semester:	Spring 2022
Course Code:	CS-2006
Pre-requisite:	Data Structures, and Computer Organization
Instructor:	Saad Farooq (Email: saad.farooq@nu.edu.pk)

### **Objective**

“Operating systems are essential part of any computer system. Similarly, a course on operating systems is an essential part of any computer science education.” (Silberschatz et. al.)

This course helps in understanding the behavior, role and scope of operating system, the underlying hardware, and the application programmes. Secondly, in this course students learn how to program in a multi-programmed and multithreaded environment. The course also introduces important system development methodologies and algorithms in the areas of CPU scheduling, process communication, memory management, concurrency, synchronization, and file systems.

### **Text Book**

Operating System Concepts (Tenth Edition)

By Silberschatz, Galvin, and Gagne

### **Additional Readings**

Operating Systems (Third Edition)

By Gary Nutt

The Little Book of Semaphores (Second Edition)

By Allen B. Downey

### **Grading Scheme**

Grading will be absolute.

### **Weightages (Tentative)**

Quizzes	10%
Assignments + Homeworks	20%
Two Midterm Exams	30%
Final Exam	40%

### **Passing Criteria**

A student must secure at least 50% marks to pass the course.

### **Attendance Policy**

Students are expected to attend all sessions. However, they might avail 20% leaves in emergency situations. Beyond this the student will not be allowed to appear in the final exam.

### **Plagiarism**

Plagiarism is not tolerable in any of its form. Minimum penalty would be an ‘F’ grade in the course. Automated tools may be deployed to detect pirated copies. Students bear all the responsibility for protecting their assignments. In case of cheating, both parties will be considered equally responsible.

### Late Submissions

Assignments must be submitted in time. Late submissions (maximum one week) would result in deduction in marks. Only the submitted articles will be marked.

### Lecture Plan (Tentative)

Week		Topic
1	Processes, Process Communication, and Threads	Introduction and Background
2		Introduction to Processes Process Management
3		Operations on Processes fork(), execlp() and wait()
4		Inter-process Communication Linux pipeline
5		Multithreading Models Thread Libraries Exploiting processing and I/O in parallel
6	Scheduling and Synchronization	Process Scheduling Basic Concepts
7		Scheduling Algorithms
8		Synchronization Critical Section Problem and its Solutions
9		Semaphores Classical Problems
10	Memory Management, and File Systems	Memory Management Challenges Paging
11		Virtual Memory Demand Paging Page Replacement Algorithms
12		File System – Introduction Allocation Methods
13		Free-Space Management Implementation
14		Deadlocks (Optional)