Department of Electrical and Computer Engineering
Semester: Spring 2023
Course Outline

Course Code : CSE 323
Course Title : Operating Systems Design
Course Type : Core course
Credit Hours : 3
Section : 5

Class Time	:	Class	Day	Time	Room No.
		Theory	RA	9:10 am-10:10 pm	NAC 991

Course Instructor : Dr. Saeed Mahmud Ullah (SMU1), Professor, EEE, DU & Adjunct Faculty, ECE, NSU
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Office : Room# SAC 1196
Office Hours : Thursday (11:20 AM to 12:50 PM) and Saturday (11:20 AM to 12:50 PM)
Course Content **:** Course content will be provided in CANVAS

Course Objectives:

1. Compare, Analyze and judge various Operating systems building blocks focusing on process management and memory management. (knowledge)
2. Build a system solution on any hardware platform that is able to talk to hardware in a group project. (design)
3. Demonstrate a contemporary Operating System where students look at Android OS. (Contemporary knowledge)

Course Contents/Descriptions:

Operating Systems Design: An introduction to the structure of modern operating systems. Topics include operating systems structure, asynchronism, mutual exclusion, deadlocks, monitors, process state transition, interrupts, context switching, storage management for both real and virtual storage, processor scheduling, multi-processing, auxiliary storage management, computer systems performance, network and security.

Unit-wise Title, Sub-Title, Learning Outcomes and Number of Classes per unit:

Sl.	Title	Sub-Title	Learning Outcome	No. of Classes
1.	Introduction to Operating system (OS)	a) Computer system organization and architecture b) OS structure	Students will get an overall idea of the purpose of OS. Basic structure of computer hardware and software.	2
2.	Services of OS	a) Process management b) Memory management c) Storage management d) Protection and security e) Kernel data structure f) open source and closed source OS	Students will understand the services provided by OS to the user and application software. They will also know the structure that OS use to store data in memory. They will understand pros and cons of different OS.	2
3.	OS structures	a) User and OS interface b) System calls and API c) OS design and implementation d) Debugging	Students will learn different user interface. They will learn OS structure starting from MS DOS, UNIX to modern Android and IOS.	4
4.	Process management	a) Process concept b) Scheduling c) Operations of process d) IPC	What is process, how they are created, different states, inter process communication mechanism.	3
5.	Threads	a) Concept b) Multithreading c) Thread models	Students will understand the difference of thread to process and its benefits over process.	2
6.	Process synchronization	a) Cooperating processes b) Producer-consumer problem c) Critical section problem d) Peterson’s solution	Students will understand the level of complicacy that can arise during process execution. They will learn their remedy.	2
7.	Process scheduling	a) Scheduling criteria b) Scheduling algorithms	Different scheduling algorithm will be learnt.	2
8.	Deadlock	a) Concept and characterization b) Methods of deadlock handling	The problem caused by deadlock and its solution will be understood.	2

9.	Memory management	a) Main memory b) Swapping c) Contiguous memory allocation d) Segmentation e) Paging	The concept of address allocation in RAM, swapping, memory segmentation and paging will be understood.	3
10.	Virtual memory	a) Demand paging b) Memory mapped files	Student will understand the concept and implementation of virtual memory.	2
11.	Storage management	a) Mass storage structure b) Disk scheduling and management	Students will understand the structure of secondary memory and its management and addressing schemes.	2
12.	File system	a) Structure b) Implementation c) Allocation methods	Students will learn how file system is managed by OS.	2
13.	Protection and security	a) Principle of protection b) Cryptography as security tool	Students will learn the basic concept of security and protection provided by OS to the computer system.	2

Instructional Strategies:

a) Lectures will be given with PPT presentation.
b) Participation and interaction with the students will be highly encouraged.

Assessment:

Assessment will be carried out with two midterm exams and a final exam at the end of the semester. Assignment will be given during the mid of the semester.

Score Distribution:		
	Mid Term 1	15%
	Mid Term 2	20%
	Quiz	10%
	Assignment/Presentation	10%
	Project	10%
	Attendance	05%
	Final	30%

Grading Policy: According to the grading policy of Northsouth University

Textbook:

1. Operating System Concepts- Silberschartz, Galvin, Gagne, 9th Edition and 10th Edition