CS 20026 Operating Systems
Spring 2022
Course Outline

No Week	Topics	Chapter
1 week	Introduction to Operating Systems: basic OS definition, computer organization, I/O, DMA, mass storage, protection, UMA and NUMA architecture, symmetric & asymmetric clustering, security, computing platforms.	Chapter 1
2nd week	Introduction to OS +Operating systems Structures: basic concept CLI, GUI, scripts, API, system programming & goals, OS design principles.	Chapter 1, 2
3rd Week	OS structure + Process Concept: basic concept, scheduler types, Queues, process creation, interprocess communication methods.	Chapter 2 + Chapter 3
4th week	Process concept + CPU scheduling : pre-emptive & non –preemptive, FCFS, SJF, SRTF, Priority, RR, multiprocessor, real –time scheduling.	Chapter 3 + chapter5(half)
5th Week	**Mid Term I**	
6th week	Process Scheduling + Threads: basic control blocks, thread models, thread concepts, process vs. threads, data and task parallelism, Amdahl's law, pthread APIs, OpenMP, threads security by scope of threads	Chapter 5 + Chapter 4
7th week	Threads + memory management : basic memory definition, dynamic allocation, problems of dynamic allocation, swapping, fragmentation, segmentation, paging, structure of page tables, System architecture.	Chapter 4 +chapter 9
8th Week	Memory Management:	Chapter 9

9th week	Virtual Memory: basic VM concept, demand paging, COW, page replacement algos, FIFO, optimal, LRU, second chance, frame allocation, thrashing, kernel memory, buddy, slab allocation.	Chapter 10
10th Week	Virtual Memory + Process Synchronization : concurrency, race condition, critical section, Peterson solution, test and set instruction, mutex, semaphore. Classical problems such as bounder buffer, reader writer, dinning philosopher.	Chapter ,6
11th Week	Mid Term II	
12th Week	Process Synchronization	Chapter 7
13th Week	Deadlock:basic concept, detection, prevention, avoidance, banker's algorithm. protection and security of resources and processes.	Chapter 8
14th Week	Deadlock	Chapter 8
15th Week	Disk Scheduling and security: (FCFS, SSTF, SCAN, CSCAN, LOOK, CLOOK). protection and security introduction	
16th Week	Project evaluation + Revision	

- **4 Quizzes: (n-1) Policy=_____ 3*2=6%**
  - **Q1,Q2: Pre Mid I Content**
  - **Q3: Pre Mid II Content**
  - **Q4: pre Final Exam**
- **2 Assignments (Programming Based):_____ 2*2=4%**
  - **A1= Kernel configuration**
  - **A2= Synchronization(Threads + semaphores)**
- **Project: _____10%**
- **Mid terms(I & II)=_____15*2=30%**
- **Final Exam= _____50%**