Course Syllabus
EC404 – Operating Systems
AY20, Spring

Module	Topics	Text
Introduction	Introduction, Computer System Overview, OS Overview	1.1 - 1.3
Introduction	Computer System Overview; OS Overview; OS Data structures - Lists, trees, hashes, bitmaps; Computing Environments	1.3 - 1.11
OS Structures	OS Services, User interfaces, System calls	2.1 - 2.3
OS Structures	System call types, System programs, OS structure	2.4 - 2.5, 2.7
OS Structures	OS structure, OS debugging, OS system generation, System boot	2.7 - 2.10
Processes	Process, Process state, Process control block, CPU switching	3.1
Processes	Threads, Process scheduling, Schedulers, Mobile systems, Context switch	3.1 - 3.2
Processes	Process creation	3.3
Processes	Process termination, Interprocess communication	3.3 - 3.4
Processes	Interprocess communication - Shared memory & Message passing	3.4
Threads	Threading	4.1 - 4.2
Threads	Threading, Threading models, Thread libraries	4.2 - 4.5
Threads	Thread libraries, Implicit Threading	4.4 - 4.5
Threads	Threading issues, Threading examples - Windows & Linux	4.6 - 4.7
Synchronization	Race condition, Critical section	5.1 - 5.3
Synchronization	Critical section, Peterson's Solution	5.1 - 5.3
Synchronization	Peterson's Solution, Hardware locks - overview; Test_and_set	5.3 - 5.4
Synchronization	Compare_and_swap; Test_and_set with bounded waiting	5.4

Module	Topics	Text
Synchronization	Mutex locks, Semaphores	5.5
Synchronization	Priority inversion, Bounded buffers with semaphores Reader-writer problem,	5.6 - 5.7
Synchronization	Dining philosophers problem, Synchronization in Windows, Linux, & Pthreads	5.7, 5.9
CPU Scheduling	Scheduling: Introduction, FCFS	6.1 - 6.2
CPU Scheduling	Scheduling: FCFS, SJF	6.3
CPU Scheduling	Scheduling: SJF, Priority scheduling, Round robin, Multi-queue	6.3
CPU Scheduling	Scheduling: Multi-processor, Real-time	6.5 - 6.6
Deadlocks	Deadlock overview, Necessary conditions, Reserved-allocation graph, Handling deadlocks, Deadlock prevention	7.1 - 7.4
Main Memory	Introduction, Address binding	8.1
Main Memory	Logical vs Physical address, Dynamic loading, Dynamic linking, Swapping	8.1 - 8.2
Main Memory	Contiguous memory allocation, Fragmentation	8.2 - 8.3
Main Memory	Paging	8.5
Main Memory	Pagining, TLB, Protecting memory, Shared pages	8.5
Virtual Memory	Organizing page tables - Hierarchical, Hashed, Inverted	8.6
Virtual Memory	Demand paging, Copy-on-write	9.1 - 9.3
Virtual Memory	Copy-on-write, Page replacement	9.3 - 9.4
Virtual Memory	Page replacement algorithms	9.4
Virtual Memory	Page replacement algorithms	9.4
Virtual Memory	Allocation of frames, Thrashing	9.5 - 9.6