OS Module Syllabus for PGDAC Sep 2023

Session 1: Introduction to OS
- What is OS; How is it different from other application software; Why is it hardware dependent?
- Different components of OS
- Basic computer organization required for OS.
- Examples of well-known OS including mobile OS, embedded system OS, Real Time OS, desktop
OS server machine OS etc. ; How are these different from each other and why
- Functions of OS
- User and Kernel space and mode; Interrupts and system calls

Sessions 2 & 3: Processes
- What is process; preemptive and non-preemptive processes
- Process management; Process life cycle
- What are schedulers – Short term, Mediumterm and Long term.
- Process scheduling algorithms – FCFS, Shortest Job First, Priority, RR, Queue. Belady's Anomaly
- Examples associated with scheduling algorithms to find turnaround time to find the better performing scheduler.
- Process creation using fork; waitpid and exec system calls; Examples on process creation; Parent and child processes
- Orphan and zombie processes

Sessions 4 & 5: Memory Management
- What are different types of memories; What is the need of Memory management
- Continuous and Dynamic allocation
- First Fit, Best Fit, worst Fit
- Compaction
- Internal and external fragmentation
- Segmentation – What is segmentation; Hardware requirement for segmentation; segmentation table and its interpretation
- Paging – What is paging; hardware required for paging; paging table; Translation look aside buffer
- Concept of dirty bit
- Shared pages and reentrant code
- Throttling

Session 6: Virtual Memory
- What is virtual memory
- Demand paging
- Page faults
- Page replacement algorithms

Session 7: Deadlock
- Necessary conditions of deadlock
- Deadlock prevention and avoidance
- Semaphore
- Mutex
- Producer consumer problem
- Dead-lock vs Starvation