**ITSC-205 -FINAL EXAM TOPICS**

**Final Exam is a written exam covers 20% before Mid Term and 80% after Midterm**

**20% before Midterm**

1. Process Management
   1. Processes management functions
   2. Processes attributes
   3. Processes and Threads
   4. PCB
   5. Process Resources
   6. Process Types
   7. Processes and signals
   8. Signals programming and system calls
   9. Process states and queues
   10. Process context -switch
   11. Process creation and termination
   12. Process communication techniques -IPCs
   13. Parent/
   14. Child process relationship
2. Process programming and system calls
   1. Differences and functions of the system calls fork, wait , exec, clone
3. Memory Management
   1. Def
   2. Memory Management functions
   3. Memory types
   4. Logical vs Physical address space
   5. Paging
   6. Pages vs. Frames
   7. Page tables structure –Intel 32 and 64 bit architectures and ARM architecture
   8. MMU and TLB
   9. Memory protection -Base and Limit register
   10. Page table implementation Two or three level- page table structures
   11. Memory protection
   12. Stack, Heap
   13. Internal and external fragmentation

**80 % after Midterm**

1. Process Synchronization and deadlocks
   1. Critical section and race condition
   2. Techniques implemented to solve synchronization problems- hardware , mutex-locks , semaphore
   3. Synchronization in Windows
   4. POSIX Synchronization
   5. Synchronization techniques and deadlocks
   6. Identify a deadlock situation
   7. Methods to handle deadlocks
2. Process Scheduling
   1. Scheduler – Short and long term scheduler
   2. CPU and I/O bound differences
   3. Processes states and queues
   4. Scheduling algorithms
   5. Scheduling criteria
   6. Linux scheduling
   7. Windows process/threads scheduling
3. Virtual Memory
   1. Working set
   2. Commit Limit
   3. Page states
   4. Swap process
   5. Page file , swap partition
   6. Demand paging
   7. Page faults – soft or hard page faults
   8. Causes of page faults
   9. Invalid pages
   10. Copy-on-Write (COW)
   11. Page replacement algorithms- FIFO and LRU
   12. Thrashing
   13. Allocating kernel memory- Buddy –System and slab allocator technique
   14. Reference bits
   15. Global vs Local allocation
   16. Linux and Windows memory management
4. Storage Devices
   1. Storage devices and file systems
   2. Disk structure – Tracks, sector , cluster , cylinders , heads
5. File Systems
   1. Definition/purpose
   2. File management Functions
   3. File /Dir structure
   4. File Types in Linux and Windows
   5. File Attributes
   6. File/ Dir Operations
   7. File/Dir security
   8. Directory structure Tree-structure
   9. File system Features
      1. Sparse
      2. Journaling
      3. Hard Links vs Symbolic Links
      4. Encryption
      5. Compression
   10. File System -Types
   11. File System mounting
   12. File System structure
       1. Inode
       2. MFT
       3. Blocks
       4. Clusters
       5. Metadata
       6. Superblocks
       7. Volume
       8. File descriptor
   13. File system Allocation
   14. File system Limitations
   15. File system calls
       1. Open
       2. Read
       3. Write
       4. Create
       5. Close
6. Programming exercises will be evaluated in final exam