TCS 502

OPERATING SYSTEMS

UNIT 1

Introduction to Operating Systems, UNIX:

- What operating systems do
- Operating System structure
- Operating System Services
- User - Operating System interface
- System calls
- Types of system calls
- Operating System structure
- Unix command
    - Command Structure
    - Internal and External commands
    - filters
- vi editor

UNIT 2

Process Management:

- Process concept
- Operations on processes
- Multithreading models
- Threading issues
- Process Scheduling
    - Basic concepts
    - Scheduling criteria
    - Scheduling algorithms
    - Multiple-Processor scheduling
    - Thread scheduling

Process Synchronization:

- Inter-process communication
- Synchronization: The Critical section problem
- Peterson's solution
- Synchronization hardware
- Semaphores
- Classical problems of synchronization

UNIT 3

Deadlocks:

- Deadlocks: System model
- Deadlock characterization
- Methods for handling deadlocks
- Deadlock prevention
- Deadlock avoidance
- Deadlock detection
- recovery from deadlock

Memory Management:

- Memory Management Strategies:
  - Background
  - Swapping
  - Contiguous memory allocation
  - Paging
  - Structure of page table
  - Segmentation
- Virtual Memory Management:
  - Background
  - Demand paging
  - Page replacement
  - Allocation of frames
  - Thrashing

UNIT 4

File System, Implementation of File System:

- File System:
  - File concept
  - Access methods
  - Directory structure
  - Protection
- File system structure
- Directory implementation
- Allocation methods
- Free space management
- Secondary Storage Structures
  - Mass storage structures
  - Disk structure
  - Disk scheduling
  - Disk management
  - Swap space management
- Protection:
  - Goals of protection
  - Principles of protection
  - Access matrix

UNIT 5

Shell Programming:

- Shell scripts
- Running script in the current shell
- Pattern Matching
- Redirection
- String handling
- Conditional Parameter Substitution
- Shell functions

Case Study: The Linux Operating System

- Linux history
- Design principles
- Kernel modules
- Process management
- Scheduling
- Memory management
- File systems,
- Input and output
- Inter-process communication