SavitribaiPhule Pune University
T.Y.B.Sc. (Computer Science) - Sem – V
Course Type: DSEC – I Course Code : CS - 351
Course Title : Operating Systems – I

Teaching Scheme:	No. of Credits:	Examination Scheme:
03 Lect / week	2	IE : 15 marks UE: 35 marks

Prerequisites
Data structures like stack, queue, linked list, tree, graph, hashing, file structures, any structured programming language

Course Objectives:
1. To understand the concept of operation system and its principle
2. To study the various functions and services provided by operating system
3. To understand the notion of process and threads

Course Outcomes: After completion of this course students will be able to understand the concept of
1. Processes and Thread Scheduling by operating system
2. Synchronization in process and threads by operating system
3. Memory management by operating system using with the help of various schemes

Course Contents

Chapter 1	**Introduction to Operating Systems**	**6 lectures**

- Operating Systems Overview- system Overview and Functions of operating systems
- What does an OS do?
- Operating system Operations
- Operating system structure
- Protection and security
- Computing Environments- Traditional, mobile , distributed, Client/server, peer to peer computing
- Open source operating System
- Booting
- Operating System services,
- System calls Types of System calls and their working.

Chapter 2	**Processes and Threads**	**6 lectures**

- Process Concept – The processes, Process states, Process control block.
- Process Scheduling – Scheduling queues, Schedulers, context switch
- Operations on Process – Process creation with program using fork(), Process termination
- Thread Scheduling- Threads, benefits, Multithreading Models, Thread Libraries

Chapter 3	**Process Scheduling**	**7 lectures**

- Basic Concept – CPU-I/O burst cycle, Scheduling Criteria ,CPU scheduler, Preemptive scheduling, Dispatcher
- Scheduling Algorithms – FCFS, SJF, Priority scheduling, Round-robin scheduling, Multiple queue scheduling, Multilevel feedback queue scheduling

Chapter 4	**Synchronization**	**5 lectures**

- Background
- Critical Section Problem
- Semaphores: Usage, Implementation

- Classic Problems of Synchronization – The bounded buffer problem, The reader writer problem, The dining philosopher problem

Chapter 5	**Memory Management**	**12 lectures**

- Background – Basic hardware, Address binding, Logical versus physical address space, Dynamic loading, Dynamic linking and shared libraries
- Swapping
- Contiguous Memory Allocation – Memory mapping and protection, Memory allocation, Fragmentation
- Paging – Basic Method, Hardware support, Protection, Shared Pages
- Segmentation – Basic concept, Hardware
- Virtual Memory Management – Background, Demand paging, Performance of demand paging, Page replacement – FIFO, Optimal, LRU, MFU

Reference Books:

1. Operating System Concepts, Avi Silberschatz, Peter Galvin, Greg Gagne, Student Edition, Wiley Asia
2. Operating Systems: Internals and Design Principles, William Stallings, Prentice Hall of India.
3. Advanced Concepts in Operating Systems, M Singhal and NG Shivaratri, Tata McGraw Hill Inc, 2001
4. The 'C' Odyssey, UNIX-the open boundless C, Meeta Gandhi,Tilak Shetty,Rajiv Shah, BPB publication