DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
NITK-Surathkal

Course Plan and Evaluation Plan
IV Sem B.Tech

1. **Course code** : CS252
2. **Course Title** : Operating Systems
3. **L-T-P** : [3-1-0]
4. **Credits** : 4
5. **Course Instructors** : Dr. Shashidhar G. Koolagudi (S1)
   Prof. Annappa B. (S2)
6. **Teaching Department** : Computer Science & Engineering
7. **Objective of the Course:**

   This course provides a comprehensive introduction to operating system design concepts. The course is designed to provide in-depth critique on the problems of resource management and scheduling, concurrency and synchronization, memory management, file management. Throughout the course, the study of practical aspects that pertain to the most popular operating systems such as Unix/Linux and Windows are considered as case studies.

8. **Course Coverage**:

   UNIT - I **06 Hrs**

   Operating System Introduction: Operating Systems objectives and functions, Computer System Architecture, OS Structure, OS Operations, **System Structures -** Operating System services, User OS interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure, System Boot.

UNIT – II **10 Hrs**

Process Concepts- Process Concepts, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Operations on Processes-Process Creation, Process Termination, Interprocess Communication-Shared Memory systems, Message Passing Systems, Communication in Client-Server Systems.

Multithreaded Programming- Overview, Multithreading Models, Thread Libraries, Thread Issues.

CPU Scheduling- Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling.

UNIT – III **10 Hrs**

Process Coordination- Process Synchronization, The Critical Section Problem, Petersons' solution, Synchronization Hardware, Mutex Locks, Semaphores, and Classic Problems of Synchronization, Monitors.

Deadlocks– System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

UNIT – IV **09 Hrs**

Memory Management and Virtual Memory– Logical & Physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation. Virtual Memory, Demand Paging, Copy-on-Write, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing, Allocating Kernel Memory.

UNIT – V **07 Hrs**

File System Interface – The Concept of File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection.

Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, and Swap space Management, RAID Structure.

UNIT VI: **06 Hrs**

Performance Evaluation, Operating System Security, Case studies-The UNIX Operating System

Total 48 Hrs

9. Reference Books:

[1] Silberschartz, Galvin & Gagne, Operating System Concepts, 9th Edition, John Wiley & Sons, 2013

[2] Melin Milenkovic, Operating Systems: Concepts and Design, McGraw Hill, New York, 2000.

[3] Sumitaba Das, Unix Concept and applications

10. Evaluation Plan:

End Sem. : 50%

Mid Sem. : 20%

Surprise Test : 20% (one before the Mid Sem. Exam and one after the Mid Sem. Exam. Both carry equal weightage)

Teacher's Assessment : 10% (Assignments, Simulator design etc.)

Course Instructor(s) **HOD**

(Shashidhar G. Koolagudi) (S1)

(Prof. Annappa B.) (S2)