CS010 505: Operating Systems

(Common with IT010 504)

Teaching scheme **Credits:**
3 hours lecture and 1 hour tutorial per week

Objectives

- *To understand the fundamental concepts and techniques of Operating Systems.*
- *To study the basic structure of Linux system*

Module I (8 hours)

Introduction: Operating System – Batch, Multiprogrammed, Time-sharing and Real time systems – Operating system structure – Operating system operations

System Structures: Operating system service – System calls – System Programs – System structure – Simple structure, Layered approach – Kernel, Shell.

Module II (12 hours)

Process Management: Process concept – Process state, PCB – Process scheduling – Operations on processes – Interprocess communication – Multithreading –Benefits, Models

Process Scheduling: Basic concepts – Preemptive scheduling, Dispatcher – Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling.

Module III (16 hours)

Process Synchronization: The Critical-Section problem – Peterson's solution – Synchronization Hardware – Semaphores – Classic problems of synchronization – Monitors

Deadlocks: System model – Deadlock characterization – Methods for handling deadlocks – Prevention, Avoidance and Detection – Recovery from deadlock.

Module IV (14 hours)

Memory Management: Resident Monitor – Dynamic loading – Swapping – Contiguous memory allocation – Paging – Basic, Multi-level Paging – Segmentation
Virtual Memory – Demand Paging – Page Replacement algorithms – Allocation of Frames – Thrashing – Cause of thrashing.

Module V (10 hours)

File System: File concept – Access methods – Directory structure – Directory implementation – Linear list, Hash table – Disk scheduling

Case study: Linux system.

Reference Books

1. Abraham Silberschatz, Peter B.Galvin and Greg Gagne, "*Operating System Concepts*", John Wiley & Sons Inc, 8th Edition 2010.
2. D M Dhamdhere, "*Operating Systems A Concept-based Approach*", Tata McGraw Hill, New Delhi, 2nd Edition, 2010.
3. Achyut S Godbole, *"Operating Systems"*, Tata McGraw Hill , New Delhi, 2nd Edition, 2009.
4. Elmasri, Carrick, Levine, "*Operating Systems A Spiral Approach*", Tata McGraw Hill, New Delhi, First Edition 2010.
5. Gary Nutt, "Operating Systems", Second Edition, Addison Wesley, 2003.
6. Andew S. Tanenbaum, "*Modern Operating*", Pearson Education, Second Edition, 2001.
7. Promod Chandra P.Bhatt, "*An introduction to Operating Systems Concepts and Practice*", PHI, New Delhi, Third Edition, 2010
8. B Prasanalakshmi, "*Computer Operating Systems*", CBS Publishers, New Delhi, First Edition, 2010
9. D P Sharma, "Foundation of *Operating Systems*", EXCEL BOOKS, New Delhi, First Edition 2008
10. Brian L Stuart, "*Operating Systems Principles, Design and Applications*", Cengage Learning, New Delhi, First Edition 2009.
11. Charles Crowley, "*Operating Systems A Design Oriented Approach*", Tata McGraw Hill, New Delhi, First Edition 2009.
12. Pabitra Pal Choudhaury, " *Operating Systems Principles and, Design*", PHI, New Delhi, First Edition, 2009