

Paper Code	Operating Systems	L	T	P	C
105403		3	0	0	3

**Unit-1.0****7 hrs.**

**Introduction:** Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS-Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

**Unit-2.0****8 hrs.**

**Processes:** Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching.

**Thread:** Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads

**Process Scheduling:** Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

**Unit-3.0****8 hrs.**

**Inter-process Communication:** Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer - Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Shared Memory, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc.

**Unit-4.0****5 hrs.**

**Deadlocks:** Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

**Unit-5.0****7 hrs.**

**Memory Management:** Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging and Segmentation: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Advantages and Disadvantages of paging and segmentation.

**Virtual Memory:** Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

**Unit-6.0****7 hrs.**

**File Management:** Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free- space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

**Disk Management:** Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN,

Disk reliability, Disk formatting, Boot-block, Bad blocks

**I/O Hardware:** I/O devices, Device controllers, Direct memory access, Principles of I/O

Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software,

Secondary-Storage Structure.

**Suggested books:**

1. Operating System Concepts Essentials, 9th Edition by Avi Silberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.
3. Operating Systems: Design and Implementation 3rd Edition, 3rd Edition, Andrew S. Tanenbaum

**Suggested reference books:**

1. Modern Operating Systems, 4th Edition, Andrew S. Tanenbaum
2. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing  
Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison- Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

Paper Code	Human Resource Development and Organizational Behavior	L	T	P	C
100407		3	0	0	3

**Unit-1.0****7 hrs.**

**Introduction:** HR Role and Functions, Concept and Significance of HR, Changing role of HR managers - HR functions and Global Environment, role of a HR Manager. Human Resources Planning: HR Planning and Recruitment: Planning Process - planning at different levels - Job Analysis

**Unit-2.0****7 hrs.**

**Recruitment and selection processes** - Restructuring strategies - Recruitment-Sources of Recruitment-Selection Process-Placement and Induction-Retention of Employees. Training and Development: need for skill upgradation - Assessment of training needs - Retraining and Redeployment methods and techniques of training employees and executives – performance appraisal systems.

**Unit-3.0****7 hrs.**

**Performance Management System:** Definition, Concepts and Ethics-Different methods of Performance Appraisal- Rating Errors Competency management. Industrial Relations : Factors influencing industrial relations - State Interventions and Legal Framework - Role of Trade unions - Collective Bargaining - Workers; participation in management.

**Unit-4.0****7 hrs.**

**Organizational Behaviour:** Definition, Importance, Historical Background, Fundamental Concepts of OB, Challenges and Opportunities for OB.

**Unit-5.0****7 hrs.**

**Personality and Attitudes:** Meaning of personality, Personality Determinants and Traits, Development of Personality, Types of Attitudes, Job Satisfaction.

**Unit-6.0****7 hrs.**

**Leadership:** Definition, Importance, Theories of Leadership Styles. Organizational Politics: Definition, Factors contributing to Political Behavior. Conflict Management: Traditional vis-a-vis Modern View of Conflict, Functional and Dysfunctional Conflict, Conflict Process, Negotiation - Bargaining Strategies, Negotiation Process.

**Suggested books:**

1. Gary Dessler, "Human Resource Management" - (8<sup>th</sup> ed.,) Pearson Education, Delhi.
2. Robbins, S.P., Judge & T.A., "Organizational Behavior", Pearson Education, 15<sup>th</sup> Edn.

**Suggested reference books:**

1. Decenzo & Robbins, Personnel Human Resource Management, 3<sup>rd</sup> ed., John Wiley & Sons (Pvt.) Ltd.
2. Biswajeet Patanayak, Human Resource Management, PHI, New Delhi
3. Luis R. Gomez, Mejia, Balkin and Cardy, Managing Human Resources PHI, New Delhi
4. Luthans, Fred: Organizational Behavior, McGraw Hill, 12<sup>th</sup> Edn.
5. Shukla, Madhukar: Understanding Organizations - Organizational Theory & Practice in India, PHI

Paper Code	Operating Systems Lab	L	T	P	C
105403P		0	0	2	1

**Preform all Experiments**

**Operating System Lab: -**

1. Write a program to implement FCFS scheduling algorithm.
2. Write a program to implement SJF scheduling algorithm.
3. Write a program to implement priority scheduling algorithm.
4. Write a program to implement round robin scheduling.
5. Write a program to implement banker's algorithm.
6. Write a device driver for any device or peripheral.
7. Write a program to implement disk scheduling algorithm.
8. Write a program to implement dining philosopher problem.
9. Write a program to implement producer consumer problem.
10. Write a program to implement LRU page replacement algorithm.