# COURSE HANDOUT

OPERATING SYSTEM (MCA-101)

MCA-1ST SEMESTER

ACADEMIC YEAR (2024-25)

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| Course Code | Course Name | Course Type | Cd | L | T | P | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sessional | Final Exam | Total |
| MCA-101 | Operating System | PCC | **4** | **4** | **0** | 0 | 40 | 60 | 100 |

**COURSE OUTCOMES**

| At the end of the course the student will be able to: | |
|---|---|
| CO1 | Demonstrate understanding of the concepts, structure and design of operating systems |
| CO2 | Articulate the general architecture of modern computer operating systems including its impact on application design and performance |
| CO3 | Develop understanding of inter-process communication and synchronization mechanisms |
| CO4 | Analyze the interplay and conflicts in resource usage in a multi-user, multi-tasking environment with an understanding of the trade-offs involved |
| CO5 | Implement the basic concepts of Unix & Linux and programs using shell programming. |

**Unit 1: Introduction to Operating Systems:** Evolution of operating systems, Operating systems concepts, Types of operating systems, Different views of the operating system, Operating system services, System calls, Types of system calls, Operating system Structure, Layered Approach, Micro kernels, Virtual machines.

(10 Hrs)

**Unit 2: Process Management:** Process concept, Operation on processes, Inter-process communication, Mutual exclusion, Introduction to Process scheduling, Scheduling algorithms, Process Synchronization, Inter process Synchronization, Critical section problem, Semaphores, Monitors, Message passing, Deadlocks, System Model, Deadlock characterization, Deadlock prevention, Deadlock avoidance**.**

(10 Hrs)

**Unit 3: Memory Management:** Memory management, Swapping, Contiguous memory allocation, Relocation & protection, Memory management, Paging, Segmentation, Intel Pentium Segmentation, Intel Pentium Paging, Virtual memory, Demand paging, Performance of demand paging, Page replacement algorithms: FIFO, Optimal, LRU, Counting based page replacement.

(10 Hrs)

**Unit 4: File & I/O Management:** File & I/O Management Files system structure, File system implementation, Directory Implementation. Allocation Methods, contiguous allocation, linked allocation, Indexed allocation Disk organization, Disk space management, Disk scheduling, Disk Management, RAID Structure.

(10 Hrs)

**Unit 5: Introduction to LINUX/UNIX:** Files and Directories: pathname; Directory Tree; current working directory; Relative pathname; Referring to home directories; Device files; File permissions; Pipes; Trees; mount, init, Files, Directories, Processes, Commands: pwd, mkdir, rmdir, ls, cat, more, mv, cp, rm, diff, wc, pwd, wc, who write, who am i, passwd, ps, kill, date, cal,man, gzip, df, chmod, mkdir, cd. Filters: pr, head, tail, cut, paste, sort, uniq, nl, tr. Regular Expression: grep; egrep; fgrep, Vi-Editor, adding and replacing text, commands in Command mode, Deletion,Navigation, pattern search, repeating commands, Shell Programming, Logical Operators, If else Statement, Case structure, Looping.

(10 Hrs)

**Textbooks**

| S.No. | Name of the Books | Author | Publisher Name | Edition (Pub. yr.) |
|---|---|---|---|---|
| 1 | Operating System Concepts | Abraham Silberschatz, Peter B. Galvin, Gerg Gagne | Wiley | 9th (2015) |
| 2 | Operating System Design and Implementation | Andrew S. Tanenbaum | Pearson | 3rd (2007) |
| 3 | UNIX Concepts and Application | Sumitabha Das | Tata McGraw Hill, | 4th(2017) |

**Reference Books**

| S.No. | Name of the Books | Author | Publisher Name | Edition (Pub. Yr.) |
|---|---|---|---|---|
| 1 | Operating Systems: Internals and Design Principles | William Stallings | McGraw Hill | 1st (2019) |

**ADDITIONAL WEB RESOURCES**

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|---|---|
| 1. | The Enterprise Linux Resource, http://www.linux.com (Everything you need to know about linux development and deployment in an enterprise environment)<br>Vi Editor Reference Card: http://web.mit.edu/merolish/Public/vi-ref.pdf<br>Swayam - Operating Systems Online Course https://swayam.gov.in/course/237-operating-system |
| 2. | **NPTEL** – Operating Systems by Prof. Sorav Bansal (IIT Delhi) https://nptel.ac.in/courses/106/102/106102132/<br>Operating System by Prof. P.K. Biswas, IIT Kharagpur**:** **https://onlinecourses.nptel.ac.in/noc20_cs04/preview**<br>Operating Systems by Prof. Sorav Bansal (IIT Delhi): https://nptel.ac.in/courses/106/102/106102132/ |

**GRADING AND ASSESSMENT**

- **Sessional Test**: 60 marks
- **Assignment**: 10 marks
- **Attendance**: 10 marks
- **Final Examination**: 60 marks

**COURSE POLICIES**

- **Attendance**: Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity**: MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions**: Assignments and projects must be submitted by the specified timelines.

**FACULTY INFORMATION**

- **Office Hours**
  Monday (12:05 PM - 12:55 PM)
  Friday (12:05 PM - 12:55 PM)

- **Contact Information** sukhmeet.cse@mietjammu.in