

PART A: Introduction			
Program: Certificate	Class: B.C.A.	Year: I Year	Session: 2025-26
Subject: Computer Applications			
1. Course Code			
2. Course Title		Operating System (Theory)	
3. Course Type (Core Course/DSE/Minor/MD-ID/ SEC/VOC)			Minor – II
4. Pre-Requisite (if any)		To study this course, a student must have basic knowledge of Computers.	
5. Course Learning Outcomes (CLO)		<p>After the completion of this course, a successful student will be able to do the following:</p> <ol style="list-style-type: none"> 1. Describe the importance of computer system resources and the role of operating system in their management policies and algorithms. 2. Specify objectives of modern operating systems and describe how operating systems have evolved over time. 3. Understand various process management concepts and can compare various scheduling techniques, synchronization, and deadlocks. 4. Describe the concepts of multithreading and memory management techniques. 5. Identify the best suited memory management technique for any process. 6. Describe various file operations, file allocation methods and disk space management. 7. To understand and identify potential threats to operating systems and the security features design to guard against them. 8. Learn to operate the Linux system, along with its administration and Shell programming 9. Getting to know the Android OS and its application framework. 	
6. Credit Value		Theory – 3 Credits	
7. Total Marks	Max. Marks : 30 + 70	Min. Passing Marks: 35	

PART B: Content of the Course	
No. of Lectures (in hours per week):	2 Hrs. per week
Total No. of Lectures:	45 Hrs.



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Module	Topics	No. of Lectures
I	<p>Indian Knowledge System: The BOSS operating system, open source softwares, growth of LINUX, Aryabhatt Linux, contributions of innovators – Rajen Sheth, Sunder Pichai etc.</p> <p>Suggested Activities: <i>Aryabhatt Linux Coding Sprint, Open Source Innovation Hackathon</i></p>	02
II	<p>Introduction to Operating System: What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.</p> <p>Process Management: Process Concepts, Process states & Process Control Block.</p> <p>Process Scheduling: Scheduling Criteria, Scheduling Algorithms (Preemptive & Non- Preemptive) – FCFS, SJF, SRTN, RR, Priority, Multiple-Processor, Real-Time, Multilevel Queue and Multilevel Feedback Queue Scheduling.</p> <p>Deadlock - Definition, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock.</p> <p>Suggested Activities: <i>OS Evolution Timeline, OS Simulator Challenge, Process Scheduling Debate, Deadlock Detection Lab, Real-Time OS Case Study, OS Simulation with Deadlock Avoidance.</i></p>	15
III	<p>Memory Management: Introduction, Address Binding, Logical versus Physical Address Space, Swapping, Contiguous & Non-Contiguous Allocation, Fragmentation (Internal & External), Compaction, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms.</p> <p>File Management: Concept of File System(File Attributes, Operations, Types), Functions of File System, Types of File System, Access Methods (Sequential, Direct & other methods), Directory Structure (Single-Level, Two-Level, Tree-Structured, Acyclic-Graph, General Graph), Allocation Methods (Contiguous, Linked, Indexed)</p> <p>Disk Management: Structure, Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK), Swap Space Management, Disk Reliability, Recovery.</p>	15



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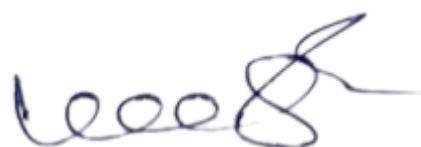
	Suggested Activities: Memory Management Simulator, File System Design Challenge, Disk Scheduling Algorithm Race, Virtual Memory Management Simulation, Disk Management Case Study, File System Forensics Lab.	
IV	<p>LINUX: Introduction, History and features of Linux, advantages, hardware requirements for installation, Linux architecture, file system of Linux - boot block, super block, inode table, data blocks.</p> <p>Linux standard directories, Linux kernel, Partitioning the hard drive for Linux, installing the Linux system, system - startup and shut-down process, init and run levels. Process, Swap, Partition, fdisk, checking disk free spaces. Difference between CLI OS & GUI OS, Windows v/s Linux, Importance of Linux Kernel, Files and Directories. Concept of Open Source Software.</p> <p>Suggested Activities: Linux OS Architecture Poster, Linux System Installation Lab, Linux File System Exploration, CLI vs. GUI Challenge, Linux Kernel Deep Dive, Open Source Software Debate.</p>	13

PART C: Learning Resources	
Textbooks, Reference Books, Other Resources	
Suggested Readings:	
Textbooks:	
1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications. 2. A. S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education. 3. Operating System by Peterson. 4. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।	
Reference Books:	
1. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education. 2. W. Stallings, Operating Systems, Internals & Design Principles, 8th Edition, Pearson Education. 3. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill. 4. Operating System design and Concepts by Milan Milenkovic.	
Suggestive Digital Platform Web Links:	
https://www.eshiksha.mp.gov.in/mpdhe https://epgp.inflibnet.ac.in	
Suggested Equivalent Online Courses:	
https://nptel.ac.in/courses/106/102/106102132/	



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Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:	100	
Continuous Comprehensive Evaluation (CCE):	30 Marks	
University Exam (UE):	70 Marks	
Internal Assessment:		
Continuous Comprehensive Evaluation (CCE)		Total Marks: 30
External Assessment:		
University Exam Section	Section (A) : Very Short Questions	
Time: 03.00 Hours	Section (B) : Short Questions	Total Marks: 70
	Section (C) : Long Questions	



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PART A: Introduction Program: Certificate Class: B.C.A. Year: I Year Session: 2025-26 Subject: Computer Applications			
1.	Course Code		
2.	Course Title	Operating System (Practical)	
3.	Course Type (Core Course/DSE/Minor/MD-ID/SEC/VOC)	Minor – II	
4.	Pre-Requisite (if any)	To study this course, a student must have basic knowledge of Computers.	
5.	Course Learning Outcomes (CLO)	After the completion of this course, a successful student will be able to do the following: 1. Operate the Linux system. 2. Do administration 3. Do Shell programming	
6.	Credit Value	Practical – 01 Credits	
7.	Total Marks	Max. Marks: 100	Min. Passing Marks: 35

PART B: Content of the Course No. of Lab Practical's (in hours per week): 1 hours per week Total No. of Lab.: 15 Hrs.		
	Suggestive list of Practical's	No. of Labs.
	1. Linux Directory Commands: pwd, mkdir, rm -rf, ls, cd, cd / , cd ~ 2. Linux File Commands: touch, cat, cat >, cat >>, rm , cp, mv, rename 3. Linux Permission Commands: su, id, useradd, passwd, groupadd, chmod, groupdel, chown, chgrp 4. Linux File Content & Filter Commands: head, tail, tac, more, less, grep, cat, cut, grep, comm, sed, tee, tr, uniq, wc, od, sort, diff. 5. Linux Utility Commands: find, bc, locate, date, cal, sleep, time, df, mount, exit, clear, gzip, gunzip. 6. Linux Networking Commands: ip, ssh, mail, ping, host 7. Edit Crontab file: to wall message on system on particular time automatically. 8. Vi editor: Create file, edit, save and quit. Highlighting the searched term within a file. cut, yank, undo.	15 Hrs.

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<https://www.eshiksha.mp.gov.in/mpdhe>

<https://epgp.inflibnet.ac.in>

Suggested Equivalent Online Courses:

<https://nptel.ac.in/courses/106/102/106102132/>

PART D: Assessment and Evaluation**Suggested Continuous Evaluation Methods:**

Internal Assessment	Marks	External Assessment	Marks
Class Interaction/Quiz		Viva voce practical	
Attendance		Practical record file	
Assignments (Charts/ Model/Seminar/Rural Services/ Technology Dissemination/Report of Excursion/Lab visit/ Survey/Industrial Visit)		Table work/Experiment	
Total	30		70



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