Government Holkar (Model, Autonomous) Science College, Indore (M.P.)

Computer Science Department

Part A - Introduction				
Programme - B.Sc. (Computer Science - Major)		**Class** – B.Sc. V Semester	**Year**- 2024	**Session**- 2024-25
Course Type (Computer Science) – Major				
1	**Course Code**	S5-CSC1T		
2	**Course Title**	Operating System		
3	**Pre – requisite (if any)**	-		
4	**Course Learning Outcomes (CLO)**	After the completion of this course, a student shall be able to do the following: 1. Grasp the historical evolution and fundamental functions of operating systems, distinguishing between various types of operating systems. 2. Apply process management concepts, including process states, PCBs, and scheduling algorithms, to optimize resource allocation and process control. 3. Analyze memory management principles, address binding, allocation methods, and storage optimization, applying this knowledge to manage data and storage efficiently. 4. Synthesize understanding of security threats and protection mechanisms within operating systems, evaluating and comparing prevalent operating systems for strengths, weaknesses, and contributions. 5. Evaluate real-world operating system applications and synthesize knowledge to make informed decisions about selecting the appropriate OS for specific computing environments, considering performance, security, and Indian contributions to the field.		
5	**Credit Value**	4 Credits		
6	**Total Marks**	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks **Total 40+60= 100 Marks**	**Minimum Pass Marks – 35**	

Mr. Mohit Gupta	Mr. Manish Kumar	Dr. Ugrasen Suman	Dr. Sharad Gangele	Dr. Sanjeev Sharma	Dr. Pradeep Sharma
Student	Industrial Person	Subject Expert	Subject Expert	Subject Expert	Convener & HoD
Clause 06	Clause 05	Clause 04	Clause 03	Clause 03	

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Course Title	Operating System		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	**Topics**	**No. of Lectures**
I	Introduction to Operating System: What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems: Multiprogramming Systems, Multiprocessing System, Batch Systems, Time Sharing Systems, Distributed OS, Real Time systems. Operating Systems for Personal Computers, Workstations, and Hand-held Devices. Applications of various operating systems in real world.	8
II	Process Management: Process Concepts, Process states & Process Control Block. 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. Deadlock: Definition, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock. Deadlock Handling Approaches: Prevention, Avoidance, Detection and Recovery.	14
III	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, and thrashing.	14

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S. No.	Topics	No. of Lectures
IV	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). Disk Management: Structure, Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C- SCAN, LOOK), Swap Space Management, Disk Reliability, Recovery. Security: Security Threats, Security policy mechanism, Protection, Trusted Systems, Authentication and Internal Access Authorization, Windows Security.	14
V	DOS (Disk Operating System): DOS Basics: Booting, Post, BIOS, FAT, COM.EXE & Batch File, Pipes. Filters. DOS Commands: Internal: DIR, MD, CD, RD, COPY, DEL, REN. VOL. VER. DATE. TIME, CLS. PATH, TYPE. PROMPT. External: CHKDSK. DOSKEY, XCOPY, MOVE, TREE, DEL TREE LABLE, APPEND, FORMAT. UNFORMAT, PRINT, FDISK, SORT, MORE. ATTRIB, EDIT, SYS, DISKCOPY, DISKCOMP, BACKUP, RESTORE. Some prevalent operating systems - Windows, UNIX/Linux, Android, MAC OS, Blackberry OS, Symbian, Bada etc., comparison of windows and UNIX. Indian contribution to the field the BOSS operating system, open source softwares.	10

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Course Title	Operating System		

Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, John Wiley Publications.
2. A.S. Tanenbaum, Modern Operating Systems, Pearson Education.
3. L.Peterson, Operating System Concepts.

Reference Books:

1. G. Nutt, Operating Systems: A Modern Perspective, Pearson Education.
2. W. Stallings, Operating Systems, Internals & Design Principles, Pearson Education.
3. M. Milenkovic, Operating Systems- Concepts and Design, Tata McGraw Hill.

Suggested Digital Platforms Web Links:

1. https://web.iitd.ac.in/~minati/MTL458.html
2. https://www.cse.iitb.ac.in/~mythili/os/
3. https://www.youtube.com/watch?v=aCJ3YgoolHQ

Suggested Equivalent Online Courses:

1. https://nptel.ac.in/courses/106/102/106102132/

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Course Title		Operating System	

Part – D Assessment and Evaluation				
Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc. The division of marks is as follows:			**External Evaluation (Summative Assessment):** **End Semester Exam:60 Marks** Time: 03 hours	
Test I	20 Marks	Best two test Marks = (20 + 20)	**Section (A):** 5 Objective Questions (1 mark each)	5 x 1= 5
Test II	20 Marks		**Section (B):** 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
Test III	20 Marks		**Section (C):** Two long questions out of four questions (500 Words each) (10 Marks each)	2 x 10 = 20
Total Internal Assessment (CCE) Marks		**40 Marks**	Total External Evaluation (Theory) Marks (A+B+ C)	**60 Marks**
Note;-	**1.**	**For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.**		
	2.	**The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.**		

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Part A- Introduction (Practical)				
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. V Semester	**Year**- 2024	**Session**- 2024--25	
Course Type (Computer Science) – Major				
1.	Course Code	S5-CSC1TP		
2.	Course Title	Operating System Lab		
3.	Pre-requisite (if any)			
4.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to do the following:** 1. Develop a foundational understanding of operating systems, including their history, key functions, and resource abstraction. 2. Apply knowledge of DOS (Disk Operating System) basics, including booting, file allocation table (FAT), and batch scripting, to perform common operations and execute various DOS commands. 3. Demonstrate proficiency in managing files and directories using DOS commands, including creating, deleting, moving, renaming, and listing files and directories. 4. Utilize DOS filters and utilities, such as pipes, filters, and external commands like CHKDSK, FORMAT, and BACKUP, to manipulate and maintain files and data efficiently. 5. Synthesize knowledge of basic operating system concepts and DOS to perform a comparative analysis of different operating systems, including DOS, Windows, UNIX/Linux, and their practical applications in real-world scenarios.		
5.	Credit Value	2 Credits		
6	**Total Marks**	Formative Assessment (CCE)-40 Marks Summative Assessment (End Semester Exam) – 60 Marks **Total 40+60= 100 Marks**	**Minimum Pass Marks-35**	

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Clause 06	Clause 05	Clause 04	Clause 03	Clause 03	

Part B- Content of the Course	
Total no. of lectures – As per UGC rules: 30	
Suggestive List of Practicals	
1.	DIR, MD, CD, RD, COPY, DEL, REN,
2.	VOL. VER. DATE. TIME, CLS, PATH, TYPE. PROMPT.
3.	CHKDSK. DOSKEY, XCOPY, MOVE, TREE, DEL TREE. LABLE
4.	APPEND, FORMAT, UNFORMAT, PRINT, FDISK,
5.	SORT, MORE., ATTRIB, EDIT, SYS
6.	DISKCOPY, DISKCOMP, BACKUP, RESTORE.
7.	Help, *,
8.	Implement FCFS Algorithm
9.	Implement RR Algorithm
10.	Implement SJF Algorithm

Part – C Learning Resources
Text Books , Reference Books, Other Resources

Suggested Readings:

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3. https://www.youtube.com/watch?v=aCJ3YgoolHQ

Suggested Equivalent Online Courses:

1. https://nptel.ac.in/courses/106/102/106102132/

Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	**40 Marks**
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	**60 Marks**
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	**(40 + 60 =100 Marks)**