



बिरसा मुंडा द्रायबल युनिवर्सिटी Birsa Munda Tribal University

राजपिपला, जि० नर्मदा Rajpipla, Dist. Narmda
Established by Tribal Development Department, Govt. of Gujarat

School of Computer Science

P.G.D.C.A. (Post Graduate Diploma in Computer Applications) Programme

Subject Code & Name: PGDCA104-2- Operating Systems

Teaching And Evaluation Scheme:

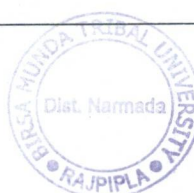
Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
4	-	-	4	50%	-	50%	-

Programme Name	P.G.D.C.A.
Semester	1
Course Code	PGDCA104-2
Course Title	Operating Systems
Course Content Type (Th. / Pr.)	Th.
Course Credit	4
Sessions + Lab Per Week	4
Total Teaching Hours	60

Learning Objectives

Upon successful completion of this course, students will be able to:

- Understand the fundamental concepts, structure, functions, and evolution of operating systems.
- Develop knowledge of process management, CPU scheduling, synchronization, and deadlock handling mechanisms.
- Understand memory management techniques and resource allocation strategies used in modern operating systems.
- Explain file system organization, disk management, I/O systems, and device management concepts.



- Differentiate between Character User Interface (CUI) and Graphical User Interface (GUI) environments.
- Develop practical skills in DOS, Windows, and Linux operating environments.
- Apply Linux command-line operations and shell scripting techniques for system administration and automation tasks.
- Analyze operating system services and evaluate suitable resource management techniques for efficient system performance.

Learning Outcomes

After successful completion of the course, students will be able to:

- Explain the concepts, structure, functions, services, and classifications of operating systems along with process and thread management fundamentals.
- Apply CPU scheduling algorithms, synchronization techniques, and deadlock handling methods to manage processes and system resources efficiently.
- Analyze memory management techniques, virtual memory concepts, file systems, disk management, and I/O operations used in modern operating systems.
- Utilize GUI and CUI operating environments for performing system administration, file management, and resource management tasks.
- Evaluate and execute operating system commands and utilities in DOS, Windows, and Linux environments for effective system operation and maintenance.
- Design and develop basic shell scripts using variables, conditional statements, loops, and command-line tools for task automation and system management.

CLO-PLO Mapping Matrix:

CLOs / PLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	3	1	–	1	1	1
CLO2	2	3	1	3	2	1
CLO3	2	2	3	3	2	1
CLO4	2	2	2	2	3	2
CLO5	2	2	1	3	3	3
CLO6	1	3	2	2	3	3

Detailed Contents

Unit	Topic/Sub Topic	Teaching Hours
I Introduction to Operating Systems & Fundamentals	Introduction to Operating Systems & Fundamentals: • Definition and Evolution of Operating Systems • Types of Operating Systems ◦ Batch OS ◦ Time-Sharing OS	15

	○ Distributed OS ○ Real-Time OS ○ Mobile OS • Functions of Operating System • System Components and Services • Operating System Structure ○ Monolithic, Layered, Microkernel • Process Concept ○ Process States and Process Control Block (PCB) • Threads and Multithreading Basics	
II Process Management & Memory Management	Process Management & Memory Management • CPU Scheduling ○ FCFS, SJF, Priority, Round Robin • Process Synchronization ○ Critical Section Problem ○ Semaphores and Mutex • Deadlocks ○ Conditions, Prevention, Avoidance (Banker's Algorithm) • Memory Management ○ Paging, Segmentation ○ Virtual Memory ○ Demand Paging	15
III File Systems, I/O Management & GUI/CUI Concepts	File Systems, I/O Management & GUI/CUI Concepts: • File System Concepts ○ File Structure and Access Methods ○ Directory Structure • Disk Management • I/O Systems and Device Management GUI and CUI Concepts: • Concept of CUI (Character User Interface) ○ Features, Advantages, Limitations ○ Examples: DOS, Linux Shell • Concept of GUI (Graphical User Interface) ○ Features, Advantages, Limitations ○ Examples: Windows, Linux Desktop • Comparison: GUI vs CUI • Basics of Command Interpreters (Shell)	15
IV GUI and CUI Interaction Using Commands and GUI.	GUI and CUI Interaction Using Commands and GUI. DOS Commands • Internal Commands: DIR, COPY, DEL, REN, CLS, DATE, TIME • External Commands: XCOPY, FORMAT, CHKDSK, ATTRIB • Batch File Basics Windows Environment Interactions	15

	• File and Folder Management • Control Panel Operations • Task Manager and System Tools • Disk Management Utility • Basic Networking Settings Linux Commands and Shell Scripts • File Handling: ls, cp, mv, rm, cat, touch • Directory Commands: mkdir, rmdir, cd, pwd • Permissions: chmod, chown • Process Commands: ps, top, kill • Introduction to Shell • Writing Simple Shell Scripts • Variables and Input/Output • Conditional Statements (if, case) • Loops (for, while) • Basic Script Execution	
Reference Books		
1. Silberschatz, A., Galvin, P. B., & Gagne, G. (2019). <i>Operating system concepts</i> (10th ed.). Wiley. 2. Tanenbaum, A. S., & Bos, H. (2022). <i>Modern operating systems</i> (5th ed.). Pearson. 3. Tanenbaum, A. S., & Woodhull, A. S. (2006). <i>Operating systems: Design and implementation</i> (3rd ed.). Pearson. 4. Stallings, W. (2018). <i>Operating systems: Internals and design principles</i> (9th ed.). Pearson. 5. Bach, M. J. (1986). <i>The design of the UNIX operating system</i>. Pearson. 6. Arpaci-Dusseau, R. H., & Arpaci-Dusseau, A. C. (2018). <i>Operating systems: Three easy pieces</i>. Arpaci-Dusseau Books. 7. Bovet, D. P., & Cesati, M. (2005). <i>Understanding the Linux kernel</i> (3rd ed.). O'Reilly Media. 8. Godbole, A. S. (2003). <i>Operating systems</i> (3rd ed.). McGraw Hill Education India. 9. Sinha, P. K., & Sinha, P. (2013). <i>Operating system</i>. PHI Learning. 10. Deitel, H. M., Deitel, P. J., & Choffnes, D. R. (2004). <i>Operating systems</i> (3rd ed.). Pearson India.		
Web References:		
1. https://tldp.org 2. https://www.gnu.org/doc/doc.html 3. https://man7.org/linux/man-pages 4. https://help.ubuntu.com 5. https://learn.microsoft.com/windows 6. https://learn.microsoft.com/windows-server/administration/windows-commands 7. https://access.redhat.com/documentation 8. https://opensource.org 9. https://www.geeksforgeeks.org/operating-systems		

10. https://www.tutorialspoint.com/operating_system

L:: Lecture, **T::** Tutorial, **P::** Practical

CCE:: Continuous & Comprehensive Evaluation

(CCE theory includes Mid Semester Examination, Assignment, MCQ Quizzes, Seminar, Reflective Notes, Class Participation, Case Analysis and Presentation, Slip Tests (Announced/ Surprised), Attendance etc. or any combination of these)

PWE: Practical Work Examination

(PWE includes Laboratory Practical Work, Project Work, Viva simulation exercise work etc.)

SEE:: Semester End Evaluation

