

Sri Sathya Sai College for Women, Bhopal
(An Autonomous College Affiliated to Barkatullah University Bhopal)
Department of Higher Education, Govt. of M.P.
Under Graduate Syllabus (Annual Pattern)

As recommended by Central Board of Studies and approved by the Governor of M. P.
wef 2021-2022
(Session 2023-24)
(NEP-2020)

Class	BCA
Year	I Year
Subject	Computer Applications
Course Title	Operating System
Course Type	Minor
Credit Value	4
Max. Mark	30+70 (Minimum Marks 35)

Course Outcome: After the completion of this course, a student shall be able to:

- Describe the importance of computer system resources and the role of operating system in their management policies and algorithms.
- Specify objectives of modern operating systems and describe how operating systems have evolved over time.
- Understand various process management concepts and can compare various scheduling techniques, synchronization, and deadlocks.
- Describe the concepts of memory management techniques.
- Identify the best suited process management technique for any process.
- Describe various file operations, file allocation methods and disk space management.
- To understand and identify potential threats to operating systems and the security features to guard against them.
- Learn to operate the Linux system.

Particular

Unit I	<p>Introduction to Operating System: What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Batch Systems, Multiprogramming Systems, Multiprocessing Systems, Time Sharing Systems, Distributed OS, Real time systems.</p> <p>Operating System for Personal Computers, Workstations and Hand-held Devices.</p> <p>Applications of various operating system in real world.</p> <p>Some prevalent operating systems – Windows, UNIX/Linux, Android, MacOS, Blackberry OS, Symbian, Bada etc.</p>
Unit II	<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>Deadlock Handling Approaches: Prevention, Avoidance, Detection and Recovery.</p>
Unit III	<p>Memory Management: Introduction, Address Binding, Logical versus Physical Address Space, Swapping, Contiguous & Non-Contiguous Allocation, Fragmentation</p>



	(Internal & External), Compaction, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms. 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)
Unit IV	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.
Unit V	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. 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.
Unit VI	Indian contribution to the field – the BOSS operating system, open source softwares, growth of LINUX, Aryabhata Linux, contributions of innovators – RajenSheth, Sunder Pichai etc.

Suggestion Books:

- A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications.
- A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education.
- Operating System by Peterson
- Linux by Sumitabha Das

Reference Books:

- G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education.
- W. Stallings, Operating Systems, Internals & Design Principles, 8th Edition, Pearson Education.
- M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill.

Suggestive digital platform web links

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

Suggested equivalent online courses

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



Scheme of Marks:

Maximum Marks: 100		
Continuous Comprehensive Evaluation (CCE): 30 marks, Term End Exam Theory: 70 marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/ Presentation	30
External Assessment: University Exam Section Time:03.00 Hours	Section (A) Very Short questions Section (B) Short questions Section (C) Long questions	70
		Total 100

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Class	BCA
Year	I Year
Subject	Computer Applications
Course Title	Operating System Lab
Course Type	Minor
Credit Value	2
Max. Mark	30+70 (Minimum Marks 35)
Course Outcome: After the completion of this course, a student shall be able to do the following: <ul style="list-style-type: none"> • Operate the Linux system. • Do administration • Use Vi Editor 	

Particular

List of Practicals:

Linux:

- a) **Linux Directory Commands:** pwd, mkdir, rm -rf, ls, cd, cd /, cd ~
- b) **Linux File Commands:** touch, cat, cat >, cat >>, rm, cp, mv, rename
- c) **Linux Permission Commands:** su, id, useradd, passwd, groupadd, chmod, groupdel, chown, chgrp
- d) **Linux File Content & Filter Commands:** head, tail, tac, more, less, grep, cat, cut, grep, comm, sed, tee, tr, uniq, wc, od, sort, diff.
- e) **Linux Utility Commands:** find, bc, locate, date, cal, sleep, time, df, mount, exit, clear, gzip, gunzip.
- f) **Linux Networking Commands:** ip, ssh, mail, ping, host
- g) **Edit Crontab file:** to wall message on system on particular time automatically.
- h) **Vi editor:** Create file, edit, save and quit. Highlighting the searched term within a file. cut, yank, undo.

Suggestion Books:

- Linux by Sumitabha Das
- Linux Bible

Suggested Digital Platforms Web links:

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

Suggested equivalent online courses

- <https://nptel.ac.in/courses/106/102/106102132/>
- <https://www.youtube.com/watch?v=OHCMfsNpqCc>

Scheme of Marks:

Maximum Marks: 100		
Internal Assessment :	Class Interaction / Quiz Attendance Assignments (Charts / Model Seminar / Rural Service / Technology Dissemination / Report of Excursion / Lab Visits / Survey / Industrial visit)	30
External Assessment:	Viva Voce on Practical Practical Record File Table Work / Experiments	70
		Total 100

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- Top left: A large signature, possibly "Anil".
- Top right: A signature, possibly "Om".
- Middle right: A signature, possibly "Anshu".
- Bottom center: A signature, possibly "B".
- Bottom right: A signature, possibly "Akumar".