PART A: Introduction				
Program: **Certificate**		Class: **B.C.A.**	Year: **I Year**	Session: **2021-22**

1.	Course Code	**S1 - BCAB2T**
2.	Course Title	**Operating System**
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor**
4.	Pre-Requisite (if any)	Open for all
5.	Course Learning Outcomes (CLO)	• **After the completion of this course, a student shall be able to do the following:** • 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,
6.	Credit Value	**Theory - 4 Credits Practical – 2 Credits**
7.	Total Marks	Max. Marks : **25+75**	Min. Passing Marks: **33**

PART B: Content of the Course		
No. of Lectures (in hours per week): **2 Hours per week**		
Total No. of Lectures: **60 Hrs.**		

Module	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– Batch Systems, Multiprogramming Systems, Multiprocessing Systems, Time Sharing Systems, Distributed OS, Real time systems. Operating System for Personal Computers, Workstations and Hand-held Devices. Applications of various operating system in real world. Some prevalent operating systems – Windows, UNIX/Linux, Android, MacOS, Blackberry OS, Symbian, Bada etc.	6
II	**Process Management**: Process Concepts, Process states & Process Control Block. **Process Scheduling**: Scheduling Criteria, Scheduling Algorithms (Preemptive & Non- Preemptive) – FCFS, SJF, SRTN, RR, Priority,	14

		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.	
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. **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)	14
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.	12
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.	12
VI		**Indian contribution to the field** – the BOSS operating system, open source softwares, growth of LINUX, Aryabhatt Linux, contributions of innovators – RajenSheth, Sunder Pichai etc.	2

PART C: Learning Resources

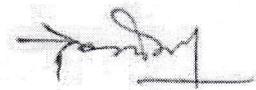Textbooks, Reference Books, Other Resources
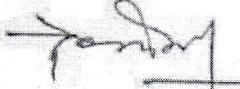
Suggested Readings

Textbooks:
- 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 Sumitabh Das
- मध्यप्रदेशहिंदीग्रंथअकादमीसेप्रकाशितविषयसेसंबंधितपुस्तकें।

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.
- Operating System design and Concepts by Milan Milenkovic.

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/

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : **25 Marks** Shall be based on allotted assignments and Class Tests. The marks shall be as follows:		External Assessment: University Exam (UE) : **75 Marks** Time : **02.00 Hours**	
Assessment and presentation of assignment	4 Marks	Section (A) : Three Very Short Questions (50 Words Each) OR Nine MCQ Questions	03 x 03 = 09 Marks **OR** 09 x 01 = **9 Marks**
Class Test I (**Objective Questions**)	5 Marks		
Class Test II (**Descriptive Questions**)	8 Marks	Section (B) : Four Short Questions (200 Words Each)	04 x 09 = 36 Marks
Class Test III (**Based on OS commands**)	8 Marks	Section (C): Two Long Questions (500 Words Each)	02 x 15 = 30 Marks
Total	**25 Marks**	Total	**75 Marks**
Any remarks/suggestions:			

PART A: Introduction				
Program: **Certificate**	Class: **B.C.A.**		Year: **I Year**	Session: **2021-22**

1.	Course Code	S1- BCAB2P
2.	Course Title	**Operating System Lab**
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor**
4.	Pre-Requisite (if any)	Open for All
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to:** • Operate the Linux system. • Do administration • Use Vi Editor
6.	Credit Value	**Practical – 2 Credits**
7.	Total Marks	Max. Marks : 25+75 Min. Passing Marks: **33**

PART B: Content of the Course		
No. of Lab. Practicals (in hours per week): **1Hr. per week**		
Total No. of Lab.: **30 Hrs.**		

Suggestive List of Practicals	No. of Labs.

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. Highligting the searched term within a file. cut, yank, undo.
	30

PART C: Learning Resources
Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:
- Linux by Sumitabh Das
- Linux Bible
- मध्यप्रदेश हिंदी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें।

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/

https://www.youtube.com/watch?v=OHCMfsNpqCc

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : **25 Marks**		External Assessment: University Exam (UE) : **75 Marks** Time : **02.00 Hours**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Hands-on Lab Practice	5 Marks	Practical record file	10 Marks
Viva	5 Marks	Viva voce practical	15 Marks
Lab Test from practical list	7 Marks	Table works/ Exercise Assigned (02) in practical exam	40 Marks
Assignments (Charts/ Model)/ Technology Dissemination/ Excursion/ Lab visit/ Industrial Training	8 Marks	Reports of excursion/ Lab visits/ Industrial training/ Survey/ Collection/ Models	10 Marks
Total *Excursion/ Lab visits/ Industrial* *Training is compulsory*	**25 Marks**	**Total**	**75 Marks**