INDEX

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

(Affiliated to JNTUA & Approved by AICTE) (Accredited by NAAC with 'A' Grade) (Accredited by NBA (CSE, ECE, EEE))

Rotarypuram Village, B K Samudram Mandal, Ananthapuramu - 515701.

Department of Computer Science & Engineering

Course Title:	Operating Systems				Course Code:	R204GA05503
Class & Sem:	III B. Tech I Sem – Sec - A				Regulations:	SRIT R20
Course Structure:	Theory	Tutorial	Lab	Credits	Core/Elective:	Core
	3	1	-	3		
Instructor 1:	Mr. M. Narasimhulu			AY:	2022-23	

1. **Prerequisites:** C, Data structures, Computer Organization

2. Course Description: This course deals with the concepts of rapidly changing fields of operating systems and networking. This course includes detailed description of operating system services and functions, inter process communication, mass storage structures, handling deadlocks, file management techniques, I/O systems, protection and security of operating system.

3. Detailed Syllabus:

UNIT 1: Introduction to Operating Systems (15 Periods)

Introduction: Operating System Operations, Resource Management, Security and Protection, Virtualization, Distributed Systems, Computing Environments.

Operating-System Structures: Operating-System Services, User and Operating-System Interface, System Calls, System Services.

UNIT 2: Process Management (14 Periods)

Processes: Process Concept, Scheduling, Operations. Inter process Communication: Shared-Memory Systems, Message-Passing Systems, Examples, Communication in Client–Server Systems. CPU Scheduling**:** Scheduling Criteria, Scheduling Algorithms, Threads.

Process Synchronization: The critical-section problem, Petersons Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors.

UNIT 3: Memory Management (11 Periods)

Contiguous Memory Allocation, Swapping, Paging, Page Replacement algorithms, Thrashing, Memory Compression.

Deadlocks: System Model, Deadlock Characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

UNIT 4: Storage Management & File System (16 Periods)

Mass-Storage Structure: Overview of Mass-Storage Structure, Disk Scheduling, Storage Attachment, RAID Structure.

I/O Systems: I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations.

File-System : File Concept, Access Methods, Directory Structure, Protection, Memory-Mapped Files, File system structure and Implementation.

UNIT 5: Security and Protection (12 Periods)

Protection: Goals, Principles and domain, Access Matrix, Implementation of Access Matrix and Access control, Revocation of Access Rights.

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool.

Total Periods: 68

4. Text Books:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley, Tenth Edition, 2018.
2. Operating Systems: Design And Implementation, Andrew S. Tanenbaum, Albert S. Woodhull, Pearson, 3rd Edition, 2015.

5. Reference Books

1. Operating Systems, A Spiral Approach, Ramez Elmasri, A.Gil Carrick, David Levine, McGrawHill Higher Education, 2010.

2. Operating Systems, Three Easy Pieces, Remzi H. Arpaci-Dusseau, Andrea C. Arpaci-Dusseau, Arpaci-Dusseau Books, 2015.
3. Operating Systems: and design Principles,5th Edition,William Stallings,PHI.

6. Course Outcomes:

On successful completion of this course, the students will be able to

S.No	Course Outcomes	Cognitive Level
1	Explain the fundamentals of operating systems like process, memory, storage, file system, security and protection.	Understand
2	Illustrate various operating System services, interfaces and system calls.	Apply
3	Demonstrate critics of process management and IPC.	Apply
4	Implement page replacement algorithms, memory management techniques and deadlock issues.	Apply
5	Illustrate architecture of file systems and I/O systems for mass storage structures.	Apply
6	Utilize the methods of operating system security and protection.	Apply

7. Additional Topics:

Sr. No.	Topic	Course Outcome
1	Open Source systems as Learning Tools	**CO1**
2	Computer system Architecture and its components organized	**CO1**

8. Course Assessment & Evaluation:

Mode of assessment	Frequency	Marks
Mid-Term Examinations (Internal)	Two exams CIE-1 and CIE-2 will be conducted. The consolidated CIE marks will be arrived by considering the marks secured by the student in both the CIEs with 80% weightage given to the better CIE and 20% to the other. For each theory course, during the semester, there shall be two CAAs. Each CAA will be evaluated for 10 marks. The consolidated CAA marks will be arrived by considering the average of marks secured by the student in both the CAAs. The final marks for CIA (for 40 marks) = Consolidated CIE marks (for 30 marks) + Consolidated CAA marks (for 10 marks)	40
University Examinations (External)	Once	60
Total		**100**

9. Mapping(X) of Course Outcomes with Program Outcomes & Program Specific Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X				X									X	
CO2	X				X									X	
CO3	X	X			X									X	
CO4	X	X			X									X	
CO5	X	X			X									X	
CO6	X				X									X	

Course Instructor **HOD**

University Calendar

Srinivasa Ramanujan Institute of Technology
(AUTONOMOUS)
Rotarypuram Village, B K Samudram Mandal, Ananthapuramu - 515 701

ACADEMIC CALENDAR

III B.Tech I Semester (A.Y: 2022-2023)

REGULATIONS: SRIT R20

Description	Duration	# Weeks/Days
I Spell of Instructions	22.08.2022 to 16.10.2022	8 Weeks
Continuous Internal Examinations-I	17.10.2022 to 23.10.2022	1 Week
II Spell of Instructions	24.10.2022 to 11.12.2022	7 Weeks
Continuous Internal Examinations-II	12.12.2022 to 18.12.2022	1 Week
Semester End Examinations - Practicals	19.12.2022 to 27.12.2022	2 Weeks
Semester End Examinations- Theory	28.12.2022 to 12.01.2023	2 Weeks
Commencement of Class work for III B.Tech II Semester for the AY 2022-2023	16.01.2023	

24/June/22
Controller of Examinations

Principal
Principal 24/6/22
Srinivasa Ramanujan Institute of Technology (Autonomous)
Ananthapuramu - 515 701, A.P.

Copy to:
HODs, Principal, Academic Section, Exam Section

CIE-1

Q. No		Questions	Unit	Marks	CO	Cognitive Level
1	a)	Define operating system.	I	2	CO1	Understand
	b)	Draw process layout in memory.	II	2	CO1	Understand
	c)	What is the basic function of paging?	III	2	CO1	Understand
UNIT- I						
2	a)	Distinguish multiprogramming and multi-tasking systems.		4	CO2	Understand
	b)	Illustrate the importance of security and protection.		4	CO2	Understand
OR						
3	a)	Describe different operations performed by the operating system.		4	CO2	Understand
	b)	Explain the illusion of virtualization with a neat diagram.		4	CO2	Understand
UNIT-II						
4	a)	Construct a memory layout diagram for a C program.		4	CO3	Apply
	b)	Write c programs that illustrate the problem of race condition.		4	CO3	Apply
OR						
5	a)	Define cooperative process. Illustrate communication models for ipc with a suitable example.		4	CO3	Apply
	b)	Construct producer-consumer problem with a suitable example.		4	CO3	Apply
UNIT-III						
6		Given page reference string: 1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1, 2,4,3. Compute the number of page faults for LRU, FIFO and optimal page replacement algorithm with frame size=4.		8	CO4	Apply
OR						
7		Illustrate continuous memory allocation with a suitable example.		8	CO4	Apply

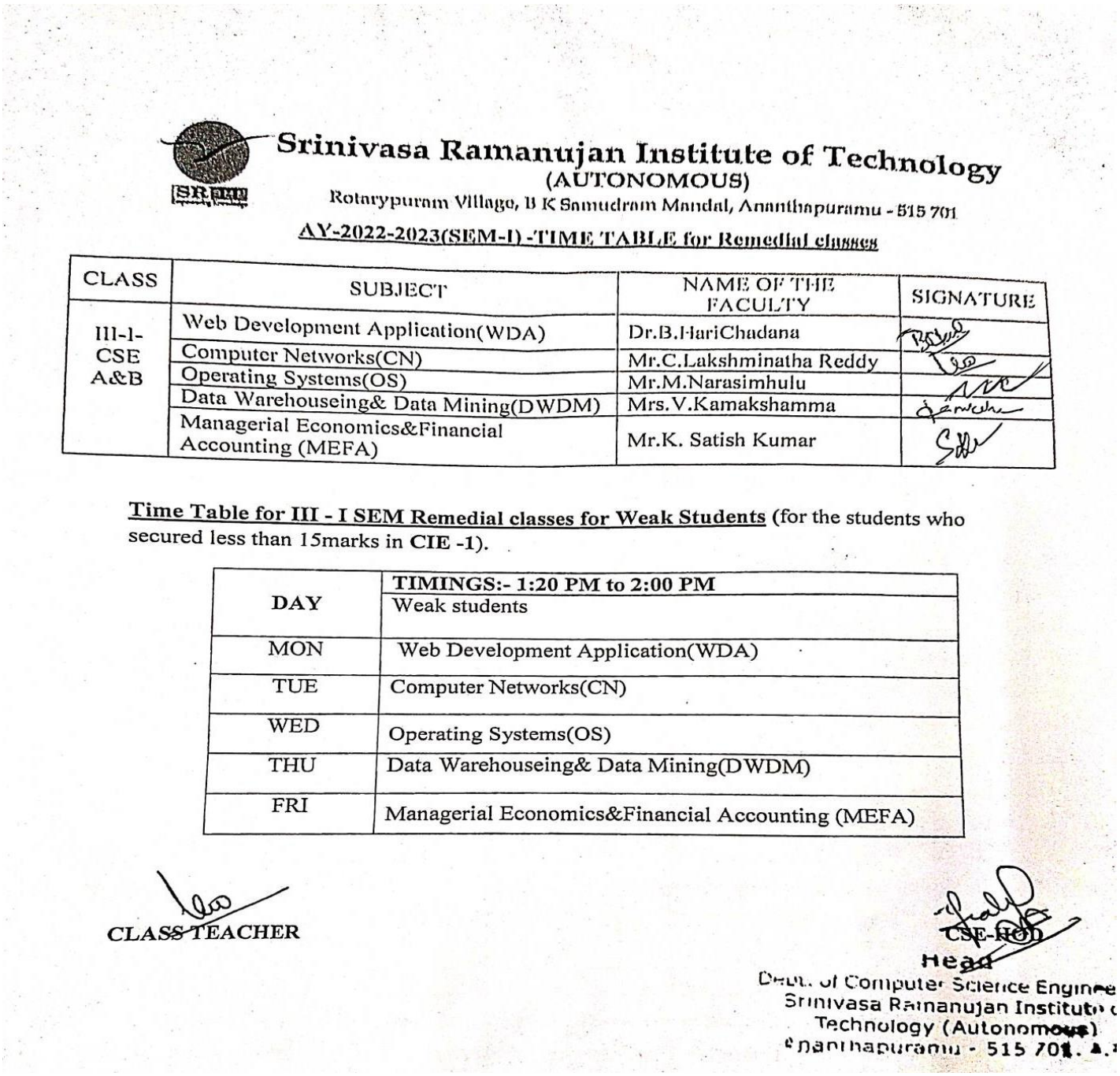
CAA-1

Continuous Alternate Assessment-I

Course Title:	Operating Systems				Course Code:	R204GA05503
Class & Sem:	III B. Tech I Sem				Regulations:	SRIT R20
Course Structure:	Theory	Tutorial	Lab	Credits	Core/Elective:	Core
	3	1		3		
Instructor 1:	Mr. M. Narasimhulu			Instructor 2:		

Q. No.	Questions	Marks	CO	Cognitive Level
	Unit-I			
1	What is operating system? Describe multiprogramming and Multi-tasking systems.	2	CO1	Understand
2	Explain different operations performed by the operating system.	2	CO1	Understand
	Unit-II			
3	Construct a memory layout diagram for a C Program.	2	CO2	Apply
4	Construct producer-consumer problem with a suitable example.	2	CO3	Apply
	Unit-III			
5	Given page reference string:1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3. Compute the number of page faults for LRU, FIFO and Optimal page replacement algorithm with frame size=4.	2	CO4	Apply

Remedial class time table:



Srinivasa Ramanujan Institute of Technology
(AUTONOMOUS)
Rotarypuram Village, B K Samudram Mandal, Ananthapuramu - 515 701

AY-2022-2023(SEM-I) -TIME TABLE for Remedial classes

CLASS	SUBJECT	NAME OF THE FACULTY	SIGNATURE
III-I-CSE A&B	Web Development Application(WDA)	Dr.B.HariChadana	
	Computer Networks(CN)	Mr.C.Lakshminatha Reddy	
	Operating Systems(OS)	Mr.M.Narasimhulu	
	Data Warehouseing& Data Mining(DWDM)	Mrs.V.Kamakshamma	
	Managerial Economics&Financial Accounting (MEFA)	Mr.K. Satish Kumar	

Time Table for III - I SEM Remedial classes for Weak Students (for the students who secured less than 15marks in **CIE -1**).

DAY	TIMINGS:- 1:20 PM to 2:00 PM Weak students
MON	Web Development Application(WDA)
TUE	Computer Networks(CN)
WED	Operating Systems(OS)
THU	Data Warehouseing& Data Mining(DWDM)
FRI	Managerial Economics&Financial Accounting (MEFA)

CLASS TEACHER

CSE-HOD
Head
Dept. of Computer Science Engineering
Srinivasa Ramanujan Institute of Technology (Autonomous)
Anantapuramu - 515 701, A.P.

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Department of Computer Science & Engineering

Methodology to support weak students & encourage bright students:

Course Title:	Operating Systems				Course Code:	R204GA05503
Class & Sem:	III B. Tech I Sem – Sec - A				Regulations:	SRIT R20
Course Structure:	Theory	Tutorial	Lab	Credits	Core/Elective:	Core
	3	1	-	3		
Instructor 1:	Mr. M. Narasimhulu			AY:	2022-23	

Methodology to support weak students:

Student who scored less than 50% of marks in the I internal assessment test will be considered as a slow learner or weak student.

Conducted special classes to improve their academic performance.

CSE-A & CSE-B:

SNO	Hall Ticket No.	Name of the Student	Mid-1
1	204G1A0537	HARSHAVARDHAN T	12
2	204G1A0562	MUHEET UR RAHMAN T MD	13
3	204G1A0578	RANGA DHAMA REDDY N	13
4	204G1A05A1	SREEKAR VAMSI KRISHNA G	11
5	214G5A0508	MEHABOOB ARAB KHAN P	14
6	214G5A0509	NAGA SIVA RAMAKRISHNA S	12
7	214G5A0511	SRINATH P	13

Course Instructor **HOD**

Course Name: Operating Systems **Regulation: R20**

Year & Sem: III-I CSE A & B **AY:2022-23**

Time Table for Special Classes (for Weak Students):

S.No.	Date	Time	Topics Discussed
1.	9-11-2022	1:20PM – 2:00PM	UNIT-1: 1. Operating system Operations 2. Operating system Services 3. System Calls and Services
2	16-11-2022	1:20PM – 2:00PM	UNIT-2: 1. Inter Process Communication 2. Semaphores 3. Monitors
3.	23-11-2022	1:20PM – 2:00PM	UNIT-3: 1. Swapping 2. Page Replacement Algorithms 3. Deadlock Detection and Avoidance 4. Recovery From DeadLock
4.	30-11-2022	1:20PM – 2:00PM	UNIT-4: 1. Disk Scheduling 2. Kernel I/O Subsystem 3. File System Structure & Implementation
5.	7-12-2022	1:20PM – 2:00PM	UNIT-5: 1. Access Matrix and its Implementation 2. System and Network Threats 3. Crytography

Course Instructor **HOD**

Course Name: Operating Systems **Regulation: R20**

Year & Sem: III-I CSE A & B **AY:2022-23**

Attendance for Special Classes:

SNO	Hall Ticket No.	Name of the Student	No. of Special Classes Conducted	No. of Special Classes Attended
1	204G1A0537	HARSHAVARDHAN T	5	4
2	204G1A0562	MUHEET UR RAHMAN T MD	5	0
3	204G1A0578	RANGA DHAMA REDDY N	5	4
4	204G1A05A1	SREEKAR VAMSI KRISHNA G	5	2
5	214G5A0508	MEHABOOB ARAB KHAN P	5	4
6	214G5A0509	NAGA SIVA RAMAKRISHNA S	5	4
7	214G5A0511	SRINATH P	5	4

Course Instructor **HOD**

CIE-2

Q. No		Questions	Unit	Marks	CO	Cognitive Level
1	a)	Define deadlock.	III	2	CO1	Remember
	b)	Classify dimensions of application I/O interface.	IV	2	CO1	Remember
	c)	List the goals of protection.	V	2	CO1	Remember
UNIT-III						
2	a)	Explain about the banker's algorithm for deadlock avoidance.		4	CO4	Understand
	b)	Describe any two solutions of recovery from deadlock.		4	CO4	Understand
OR						
3		What are the different methods of handling deadlock?		8	CO4	Understand
UNIT-IV						
4		Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The current head position is at cylinder 143. The queue of pending requests is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total distance that the disk arm moves to satisfy all the pending requests for each of the following Disk scheduling algorithms? i) SSTF ii) SCAN		8	CO5	Apply
OR						
5		Suppose that a disk drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request at cylinder 143. The queue of pending requests in FIFO order 86,1470,913,1774,948,1509, 1022, 1750, 130 starting from current head position. What is the total distance that disk arm moves to satisfy the entire pending request for FCFS and SSTF disk scheduling algorithm?		8	CO5	Apply
UNIT-V						
6		Illustrate various access matrix implementation techniques.		8	CO6	Understand
OR						
7		Explain about domains of protection.		8	CO6	Understand

CAA-2

Continuous Alternate Assessment-II

Course Title:	**Operating Systems**				**Course Code:**	**R204GA05503**
Class & Sem:	**III B. Tech I Sem**				**Regulations:**	**SRIT R20**
Course Structure:	**Theory**	**Tutorial**	**Lab**	**Credits**	**Core/Elective:**	**Core**
	3	**1**		**3**		
Instructor 1:	**Mr. M. Narasimhulu**			**Instructor 2:**		

Q. No.	**Questions**	**Marks**	**CO**	**Cognitive Level**
	Unit-III			
1	A system has four processes and five resources. The current allocation and maximum needs are as follows: Allocated Maximum Process A 1 0 2 1 1 1 1 2 1 3 Process B 2 0 1 1 0 2 2 2 1 0 Process C 1 1 0 1 0 2 1 3 1 0 Process D 1 1 1 1 0 1 1 2 2 1 Find the minimum Available matrix that makes the system in safe state.	2	CO3	Apply
	Unit-IV			
2	Explain the different Disk scheduling algorithms with their comparisons.	2	CO5	Understand
3	Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The current head position is at cylinder 143. The queue of pending requests is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total distance that the disk arm moves to satisfy all the pending requests for each of the following Disk scheduling algorithms? a) SSTF b) SCAN	2	CO5	Apply
	Unit-V			
4	Illustrate various access matrix implementation techniques.	2	CO6	Understand
5	Illustrate encryption methods with suitable scenarios.	2	CO6	Understand

Course Name: Operating Systems **Regulation: R20**

Year & Sem: III-I CSE A & B **AY:2022-23**

Special Cases – Improvement Analysis:

SNO	Hall Ticket No.	Name of the Student	Mid-1	Mid-2
1	204G1A0537	HARSHAVARDHAN T	12	15
2	204G1A0562	MUHEET UR RAHMAN T MD	13	A
3	204G1A0578	RANGA DHAMA REDDY N	13	15
4	204G1A05A1	SREEKAR VAMSI KRISHNA G	11	10
5	214G5A0508	MEHABOOB ARAB KHAN P	14	15
6	214G5A0509	NAGA SIVA RAMAKRISHNA S	12	16
7	214G5A0511	SRINATH P	13	17

Course Instructor **HOD**

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Methodology to support weak students & encourage bright students:

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Course Structure:	Theory	Tutorial	Lab	Credits	Core/Elective:	Core
	3	1	-	3		
Instructor 1:	Mr. M. Narasimhulu			AY:	2022-23	

Methodology to encourage bright students:

Student who scored more than 50% of marks in the I internal assessment test will be considered as a bright student. Conducted GATE orientation classes student.

CSE-A & CSE-B:

GATE Online Video Links

1. https://www.youtube.com/playlist?list=PLxCzCOWd7aiGz9donHRrE9I3Mwn6XdP8p
2. https://www.youtube.com/playlist?list=PLG9aCp4uE-s17rFjWM8KchGlffXgOzzVP
3. https://www.youtube.com/playlist?list=PLEJxKK7AcSEGPOCFtQTJhOElU44JJAun
4. https://www.youtube.com/playlist?list=PLEbnTDJUr_IfenRWZ73RPWNFTeGaqYQ8T

Course Instructor **HOD**

Question Bank-Unit Wise

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

III B. Tech I Sem – Question Bank

OPERATING SYSTEMS

[R204GA05503]

(Computer Science and Engineering)

CO	COURSE OUTCOMES	BL
CO1	Explain the fundamentals of operating systems like process, memory, storage, file system, security and protection.	Understand
CO2	Illustrate various operating System services, interfaces and system calls.	Apply
CO3	Demonstrate critics of process management and IPC.	Apply
CO4	Implement page replacement algorithms, memory management techniques and deadlock issues.	Apply
CO5	Illustrate architecture of file systems and I/O systems for mass storage structures.	Apply
CO6	Utilize the methods of operating system security and protection.	Apply

UNIT – 1 (2 Marks)			
#	Questions	CO	BL
1	Define System Call.	CO2	Remember
2	Define Operating System.	CO1	Remember
3	Classify Resources that is managed by OS.	CO2	Remember
4	Define Process.	CO1	Remember
5	Draw State Diagram of a Process.	CO1	Remember
6	Compare multi-programming system and multi-tasking system	CO1	Remember
7	Draw User Mode to Kernel Mode Transitions.	CO2	Remember
8	Draw Memory Layout for Multi-Programmed system.	CO2	Remember
9	Explain different operations performed by the operating system.	CO2	Remember
10	How parameters can pass to system calls?	CO2	Remember

UNIT – 1 (5/10 Marks)				
#	Questions	M	CO	BL
1	Illustrate operating system operations with neat sketches.	5/10	CO2	Understand
2	Describe multiprogramming and Multi-tasking systems.	5/10	CO1	Understand
3	Explain the illusion of virtualization with a neat diagram.	5/10	CO2	Understand
4	Illustrate the importance of Security and Protection.	5/10	CO2	Understand
5	Explain about the dual mode operation in OS with a neat block diagram.	5/10	CO2	Understand
6	Illustrate various computing environments that need OS.	5/10	CO2	Understand
7	Exemplify open system call Scenario with a neat diagram.	5/10	CO2	Understand

8	Illustrate operating system services with a neat block diagram.	5/10	CO2	Understand
9	Explain in detail the role of Operating system as a resource Manager.	5/10	CO2	Understand
10	Explain how operating systems used in a variety of computing environments.	5/10	CO2	Understand
11	Explain in detail the role of Operating system as a resource Manager.	5/10	CO2	Understand
12	Explain how operating systems are used in a variety of computing environments	5/10	CO2	Understand
13	Explain about the dual mode operation in OS with a neat block diagram.	5/10	CO2	Understand

UNIT – 2 (2 Marks)			
#	**Questions**	**CO**	**BL**
1	Draw Process Layout in Memory.	CO3	Remember
2	Draw PCB.	CO3	Remember
3	Give an example of a Process State Transition diagram.	CO3	Remember
4	What is a thread? What are the differences between process and thread?	CO3	Remember
5	What is scheduling? What criteria affect the scheduler's performance?	CO3	Remember
6	What necessary conditions can lead to a deadlock situation in a system?	CO3	Remember
7	List out any two reasons for process termination.	CO3	Remember
8	Give some benefits of multithreaded programming.	CO3	Remember
9	Define a trap.	CO3	Remember
10	Define Race Condition.	CO3	Remember
11	List requirements to solve critical section problem.	CO3	Remember

UNIT – 2 (5/10 Marks)				
#	**Questions**	**M**	**CO**	**BL**
1	Construct Critical section problem with a suitable example.	5/10	CO3	Understand
2	Construct IPC for message-passing Model with a suitable example.	5/10	CO3	Understand
3	Write a C program to create a child process that display list of files in current working directory.	5/10	CO3	Understand
4	Construct a memory layout diagram for a C Program.	5/10	CO3	Understand
5	Write structural Code for a PCB.	5/10	CO3	Understand
6	Define Cooperative Process. Illustrate Communication Models for IPC with a suitable example.	5/10	CO3	Understand
7	Construct producer-consumer problem with a suitable example.	5/10	CO3	Understand
8	Discuss about user-level threads. What are its advantages and disadvantages?	5/10	CO3	Understand
9	Make a comparison between the process and threads.	5/10	CO3	Understand
10	What are the essential properties of critical section implementation? Explain.	5/10	CO3	Understand
11	Describe the Peterson's solution for the race condition with algorithm.	5/10	CO3	Understand
12	Draw structure of a process.	5/10	CO3	Understand

13	Write C Programs that illustrate the problem of Race Condition.	5/10	CO3	Apply

UNIT – 3 (2 Marks)			
#	**Questions**	**CO**	**BL**
1	What is the basic function of paging?	CO4	Understand
2	What are the differences between paging and segmentation?	CO4	Understand
3	What is the purpose of reallocation Register?	CO4	Understand
4	What do you by degree of multiprogramming system?	CO4	Understand
5	Define Compaction.	CO4	Understand
6	What do you mean by swapping?	CO4	Remember
7	Write basic replacement Algorithm.	CO4	Understand
8	What do you mean by Belady's Anomaly?	CO4	Remember
9	List methods to implement LRU Page Replacement Algorithm.	CO4	Understand
10	Classify Counting Algorithms for a Page Relpacement.	CO4	Understand

UNIT – 3 (5/10 Marks)				
#	**Questions**	**M**	**CO**	**BL**
1	Demonstrate the causes of trashing with a suitable diagram.	5/10	CO4	Understand
2	Illustrate Continuous Memory Allocation with a suitable example.	5/10	CO4	Understand
3	Briefly explain demand paging. List out advantages and disadvantages of demand paging.	5/10	CO4	Understand
4	Compare and contrast the physical and virtual memory.	5/10	CO4	Apply
5	Discuss about optimal page replacement algorithm. If the contents of reference string is: 0, 2, 1, 6, 4, 0, 1, 0, 3, 1, 2, 1 and there are four frames available in the memory then find page fault and page fault rate using optimal page algorithm.	5/10	CO4	Apply
6	Given page reference string: 1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3. Compare the number of page faults for LRU, FIFO and Optimal page replacement algorithm.	5/10	CO4	Apply
7	What are the different methods of handling deadlock?	5/10	CO4	Apply
8	Explain the difference between internal and external fragmentation.	5/10	CO4	Apply
9	Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB, and 125 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order)? Rank the algorithms in terms of how efficiently they use memory.	5/10	CO4	Apply
10	Consider the table given below for a system, find the need matrix and the safety sequence, using Banker's algorithm. Resource – 3 types A – (10 instances) B – (5 instances) C – (7 instances)	5/10	CO4	Apply

	Process Allocation Maximum Available A B C A B C A B C p_0 0 1 0 7 5 3 3 3 2 p_1 2 0 0 3 2 2 p_2 3 0 2 9 0 2 p_3 2 1 1 2 2 2 p_4 0 0 2 4 3 3			
11	Explain any two solutions of Recovery from Deadlock	5/10	CO4	Understand
12	Explain about the bankers algorithm for deadlock avoidance	5/10	CO4	Understand
13	What is deadlock? Explain the conditions that lead to deadlock.	5/10	CO4	Understand
14	Explain about Swapping.	5/10	CO4	Understand
15	Consider the following page reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 With four Frames. How many page faults would occur for the FIFO, Optimal page replacement algorithms? Which algorithm is efficient? (Assume all frame are initially empty)	5/10	CO4	Apply
16	What is Thrashing? Explain the Causes of Thrashing.	5/10	CO4	Understand
17	What is the need of Page Replacement? Consider the following reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. Find the number of Page Faults with FIFO, Optimal Page replacement and LRU with four frames which are empty initially. Which algorithm gives the minimum number of page faults?	5/10	CO4	Apply

UNIT – 5 (2 Marks)			
#	**Questions**	**CO**	**BL**
1	Define system threats. What is known as DOS attack?	CO6	Remember
2	Define man in the middle in security attacks.	CO6	Remember
3	List the goals of protection	CO6	Remember
4	Define Access Matrix.	CO6	Remember
5	What is Access Control?	CO6	Understand
6	What are the main differences between capability lists and access lists	CO6	Remember
7	List Security violation methods.	CO6	Remember
8	List security Violation Categories.	CO6	Remember
9	How security levels are measured?	CO6	Remember
10	What is keystroke logger?	CO6	Remember
11	Define Virus.	CO6	Remember

UNIT – 5 (5/10 Marks)				
#	Questions	M	CO	BL
1	Illustrate various access matrix implementation techniques.	5/10	CO6	Understand
2	Explain about access matrix in detail.	5/10	CO6	Understand
3	Define Access control. Explain revocation of Access rights.	5/10	CO6	Understand
4	Define system threat. Give example of system threats.	5/10	CO6	Understand
5	Explain the protection mechanism illustrating the use of protection domain and access control list.	5/10	CO6	Understand
6	Describe the principles of protection. Explain the access matrix in detail.	5/10	CO6	Understand
7	Explain about domains of Protection	5/10	CO6	Understand
8	Illustrate role-based access Control with suitable diagrams.	5/10	CO6	Understand
9	Explain how Morris internet worm occurs with a suitable diagram.	5/10	CO6	Understand
10	Illustrate encryption methods with suitable scenarios.	5/10	CO6	Understand
11	Illustrate Authentication methods.	5/10	CO6	Understand

Course Internal Marks: (CIE1,CAA1,CIE2,CAA2)

SNO	Roll No.	CIE-1	CIE-2	CAA-1	CAA-2	Total
1	204G1A0501	21	22	10	7	31
2	204G1A0502	25	24	10	7	34
3	204G1A0504	22	25	10	7	33
4	204G1A0505	21	23	10	7	32
5	204G1A0506	24	24	10	7	33
6	204G1A0507	18	17	9	7	26
7	204G1A0508	22	22	9	7	30
8	204G1A0509	24	25	9	7	33
9	204G1A0510	20	24	9	7	32
10	204G1A0511	19	20	9	7	28
11	204G1A0512	18	20	9	7	28
12	204G1A0513	22	23	8	7	31
13	204G1A0514	19	23	7	7	30
14	204G1A0515	23	21	9	7	31
15	204G1A0516	21	20	9	7	29
16	204G1A0517	18	19	7	7	26
17	204G1A0518	20	15	8	7	27
18	204G1A0519	24	21	9	7	32

19	204G1A0520	20	22	8	7	30
20	204G1A0521	21	24	9	7	32
21	204G1A0522	21	20	9	7	29
22	204G1A0523	19	20	8	7	28
23	204G1A0524	18	21	9	7	29
24	204G1A0525	19	20	7	5	26
25	204G1A0526	18	17	9	5	25
26	204G1A0527	13	14	8	7	22
27	204G1A0528	21	24	9	5	31
28	204G1A0529	21	17	9	7	29
29	204G1A0530	19	20	9	7	28
30	204G1A0531	18	22	8	7	29
31	204G1A0532	20	21	8	7	29
32	204G1A0533	19	19	8	7	27
33	204G1A0534	23	16	9	7	30
34	204G1A0535	A	A	A	A	0
35	204G1A0536	18	23	8	7	30
36	204G1A0537	12	15	9	7	23
37	204G1A0538	19	18	8	6	26
38	204G1A0539	17	17	9	5	24
39	204G1A0540	19	A	8	7	23
40	204G1A0541	19	17	8	6	26
41	204G1A0542	22	19	8	7	29
42	204G1A0543	18	21	9	7	29
43	204G1A0544	20	22	9	7	30
44	204G1A0545	24	21	9	7	32
45	204G1A0546	18	17	9	7	26
46	204G1A0547	22	21	8	7	30
47	204G1A0548	25	19	8	7	32
48	204G1A0549	20	19	8	7	28
49	204G1A0551	19	24	8	7	31

50	204G1A0552	18	17	9	7	26
51	204G1A0553	16	18	5	5	23
52	204G1A0554	19	20	8	7	28
53	204G1A0555	21	22	8	7	30
54	204G1A0556	19	21	8	7	29
55	204G1A0557	25	17	9	7	32
56	204G1A0558	23	21	9	7	31
57	204G1A0559	18	18	7	7	25
58	204G1A0560	18	15	8	7	25
59	204G1A0561	19	20	9	5	27
60	204G1A0562	13	A	A	A	11
61	204G1A0563	20	19	9	7	28
62	204G1A0564	17	21	9	7	29
63	214G5A0501	21	21	9	7	29
64	214G5A0502	22	19	8	7	29
65	214G5A0503	18	19	8	5	26
66	214G5A0504	18	21	8	7	28
67	214G5A0505	24	19	8	7	31
68	214G5A0506	19	21	8	7	29
69	204G1A0565	20	20	8	8	28
70	204G1A0566	16	17	8	8	25
71	204G1A0567	20	22	9	8	31
72	204G1A0568	22	23	8	8	31
73	204G1A0569	21	25	8	8	33
74	204G1A0570	18	18	8	5	25
75	204G1A0571	22	19	8	8	30
76	204G1A0572	19	16	9	7	27
77	204G1A0573	20	16	9	8	28
78	204G1A0574	19	21	8	8	29
79	204G1A0575	15	20	8	8	27
80	204G1A0576	16	17	8	8	25

81	204G1A0577	17	17	9	7	25
82	204G1A0578	7	15	8	5	20
83	204G1A0579	21	20	8	8	29
84	204G1A0580	21	21	8	8	29
85	204G1A0581	15	19	7	7	26
86	204G1A0582	19	21	7	8	29
87	204G1A0583	25	24	8	8	33
88	204G1A0584	17	22	8	5	28
89	204G1A0585	15	21	8	5	27
90	204G1A0586	23	21	8	5	30
91	204G1A0587	23	21	8	8	31
92	204G1A0588	19	20	9	7	28
93	204G1A0589	17	24	8	5	30
94	204G1A0590	18	18	8	7	26
95	204G1A0591	19	22	9	8	30
96	204G1A0592	22	22	8	8	30
97	204G1A0593	20	22	9	5	29
98	204G1A0594	19	22	8	7	29
99	204G1A0595	20	24	8	7	31
100	204G1A0596	18	19	9	7	27
101	204G1A0597	27	25	8	7	35
102	204G1A0598	20	18	8	7	28
103	204G1A0599	24	22	9	7	32
104	204G1A05A0	18	18	8	5	25
105	204G1A05A1	11	10	8	6	18
106	204G1A05A2	19	23	9	7	31
107	204G1A05A3	15	12	6	5	20
108	204G1A05A4	19	13	8	7	30
109	204G1A05A5	25	25	8	7	33
110	204G1A05A6	17	22	8	7	29
111	204G1A05A7	20	22	8	7	30

112	204G1A05A8	19	19	9	5	26
113	204G1A05A9	25	21	8	7	32
114	204G1A05B0	19	19	9	7	27
115	204G1A05B1	17	20	9	7	28
116	204G1A05B2	25	24	8	7	33
117	204G1A05B3	A	21	8	6	24
118	204G1A05B4	19	19	8	7	27
119	204G1A05B5	20	21	8	7	29
120	204G1A05B6	19	17	8	7	27
121	204G1A05B7	17	17	8	5	24
122	204G1A05B8	17	23	8	7	30
123	204G1A05B9	17	A	6	5	20
124	204G1A05C0	18	24	8	7	31
125	204G1A05C1	19	19	9	7	27
126	204G1A05C2	20	22	8	5	29
127	204G1A05C3	16	20	8	7	27
128	204G1A05C4	26	26	8	7	34
129	204G1A05C5	25	22	9	7	33
130	204G1A05C6	18	20	7	7	27
131	204G1A05C7	22	20	8	7	30
132	204G1A05C8	18	20	8	7	28
133	214G5A0507	16	21	8	7	28
134	214G5A0508	14	15	9	7	23
135	214G5A0509	12	16	7	7	23
136	214G5A0510	17	21	8	7	28
137	214G5A0511	13	17	8	6	24
138	214G5A0512	21	23	8	7	31
139	194G1A0528	16	19	8	6	26

Course Previous Question Papers:

Hall Ticket No.: | | | | | | | | | | |

SRIT R19

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

III B. Tech I Sem – Semester End Examinations – Regular – Feb 2022

OPERATING SYSTEMS

[194GA05503]

(Computer Science & Engineering)

Time: 3 hours **Max. Marks: 70**

PART-A

(Compulsory Question)

***

1 Answer the following: (10 X 02 = 20 Marks)

a) What is a system call?
b) Define distributed system.
c) Differentiate process and program.
d) Define race condition.
e) What is demand paging?
f) Define thrashing.
g) List the types of files.
h) What is rotational latency?
i) Define system threat.
j) What is access matrix?

PART-B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT-1

2 a) Explain the operations of an operating system. [5M]

b) Discuss the various services provided by an operating system. [5M]

(OR)

3 a) Explain the procedure for handling of a user application invoking the open( ) system call with neat diagram. [5M]

b) List and explain process control and device management system calls. [5M]

UNIT-2

4 a) Construct the Gantt Chart for i) Shortest job first ii) Round Robin with q=3 Algorithms for the following. [5M]

Process	P1	P2	P3	P4	P5
CPU Burst Time (in ms)	1	6	2	8	5

b) Explain about critical section problem with a suitable example. [5M]

(OR)

5 a) Explain Petersons solutions for critical section problem. [5M]

b) Discuss in detail about message passing systems. [5M]

UNIT-3

6 a) What are the necessary conditions for a deadlock to arise in a system? Explain. [5M]

b) A system has 3 devices D1, D2 and D3 & 3 processes P1, P2, and P3. P1 is holding D1 and waiting for D3. P2 is holding D2 and waiting for D1. P3 is holding D3 and waiting for D2. Draw resource allocation graph and wait-for graph. Is the system in deadlock state or not? Explain. [5M]

(OR)

7	a)	A Process refers to five Pages, A, B, C, D, and E in the order- A; B; C; D; A; B; E; A; B; C; D; E. If the page replacement algorithm is FIFO, calculate the number of page faults with empty frames of size 3.	[5M]
	b)	Calculate the number of page faults with empty frames of size 4 using LRU for the above pages.	[5M]

UNIT-4

8	a)	Explain about the following: i) File Attributes ii) File Operations	[5M]
	b)	Explain in detail about file system structure.	[5M]
		(OR)	
9	a)	Explain the different types of directory structures.	[5M]
	b)	Explain RAID structure.	[5M]

UNIT-5

10	a)	How can the access matrix be implemented effectively? Explain.	[5M]
	b)	Discuss about revocation of access rights.	[5M]
		(OR)	
11	a)	Explain the following: i) Goals of protection ii) Principle of protection	[5M]
	b)	Discuss in detail about cryptography as a security tool.	[5M]

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Hall Ticket No.: | | | | | | | | | | |

SRIT R19

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

III B. Tech I Sem – Semester End Examinations – Supplementary – Jul 2022

OPERATING SYSTEMS

[194GA05503]

(Computer Science & Engineering)

Time: 3 hours **Max. Marks: 70**

PART-A

(Compulsory Question)

***

1 Answer the following: (10 X 02 = 20 Marks)

a) Define user interface.
b) Define distributed systems.
c) What is monitor?
d) Define mutual exclusion.
e) What is deadlock?
f) Define thrashing.
g) What are different file types?
h) List out file operations.
i) Define access matrix.
j) What is cryptography?

PART-B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT-1

2	a)	Define operating system and discuss its role from different perspectives.	[5M]
	b)	List out different services of operating system and Explain.	[5M]
		(OR)	
3	a)	What are system calls? Explain different categories of system calls with example.	[5M]
	b)	Explain the process management & memory management activities.	[5M]

UNIT-2

4	a)	What is a process? Explain Process states?	[5M]
	b)	What is a semaphore? Explain its usage?	[5M]
		(OR)	
5	a)	Explain scheduling criteria used to compare scheduling algorithms.	[5M]
	b)	What is critical section problem? Discuss Peterson's solution to the critical section problem.	[5M]

UNIT-3

6	a)	Describe structure of Paging Table.	[5M]
	b)	Describe Page Replacement Algorithm LRU.	[5M]
		(OR)	
7	a)	Describe Deadlock System Models.	[5M]
	b)	Explain Deadlock Avoidance Mechanism.	[5M]

UNIT-4

8		Explain disk scheduling algorithms with examples.	[10M]
		(OR)	
9	a)	Explain the structure of Redundant Arrays of Independent Disks(RAID).	[5M]
	b)	Define file. Explain file attributes and file operations.	[5M]

UNIT-5

10	a)	Illustrate threats occur in operating system with suitable example.	**[6M]**
	b)	Describe goals of protection.	**[4M]**
		(OR)	
11	a)	Illustrate the implementation of access control using access matrix.	**[6M]**
	b)	Explain about system security.	**[4M]**

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SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

(Affiliated to JNTUA & Approved by AICTE) (Accredited by NAAC with 'A' Grade) (Accredited by NBA (CSE, ECE, EEE))

Rotarypuram Village, B K Samudram Mandal, Ananthapuramu - 515701.

Department of Computer Science & Engineering

Course Title:	**Operating Systems**				**Course Code:**	**R204GA05503**
Class & Sem:	**III B. Tech I Sem**				**Regulations:**	**SRIT R20**
Course Structure:	**Theory**	**Tutorial**	**Lab**	**Credits**	**Core/Elective:**	**Core**
	3	**1**		**3**		
Instructor 1:	**Mr. M. Narasimhulu**			**Instructor 2:**		

SNO	CO's	Target Level	Attained Level
1	CO1	2.5	
2	CO2	2.5	
3	CO3	2.5	
4	CO4	2.5	
5	CO5	2.5	
6	CO6	2.5	

Remarks:

1. _____
2. _____
3. _____
4. _____
5. _____

Course Instructor **HOD**

Course Google Class Room links :

SNO	Year & Semester	Google Class Room Links
1	3 CSE A I Sem Operating Systems	https://classroom.google.com/c/NDk3ODUwODkwMTQ1?cjc=qnt5yun
2	3 CSE B I Sem Operating Systems	https://classroom.google.com/c/NTM5NTc3MTEwOTcy?cjc=xeua7w5
3	3 CSE A I Sem Computer Networks and Operating Systems Lab	https://classroom.google.com/c/NDk4MDQyNzU5NTQ4?cjc=i35efw4
4	3 CSE B I Sem Computer Networks and Operating Systems Lab	https://classroom.google.com/c/NTQ0NTE4MjU4OTUx?cjc=sks7vnz

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

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Rotarypuram Village, B K Samudram Mandal, Ananthapuramu - 515701.

Department of Computer Science & Engineering

Action taken report on Result Analysis

As per the discussion in department meeting on result analysis which is mentioned on minutes of meeting date: The following are the suggestions and methodologies in teaching and learning in brain storming session with all faculty members.

Best Practices:

1. _____
2. _____
3. _____

4. _____

5. _____

6. _____

Further Improvements:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Course Instructor **HOD**