Fr. Conceicao Rodrigues College Of Engineering

Department of Artificial Intelligence and Data Science Engineering

S.E. (AI& DS) (semester IV) (2022-2023)
Course Outcomes & Assessment Plan

Subject: Operating System(OS-CSC405) **Credits-3**

Course Objectives:

1. To equip students with the fundamental knowledge and basic technical competence in the field of Computer Graphics..
2. To emphasize the implementation aspect of Computer Graphics Algorithms.
3. To prepare the student for advanced areas and professional avenues in the field of Computer Graphics.

Teaching Scheme

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical/Oral	Tut	Credits
CSC405	Operating System	03	--	--	03	--	---	03
CSC405	Operating System Lab	--	02	--	--	1	--	01

Examination Scheme

Course Code	Course Name	Theory Marks				Term Work	Practical & Oral	Total
		Internal Assessment			End Sem Exam			
		Test 1	Test2	Avg				
CSC305	Operating System	20	20	20	80 (3hr)	--	---	100
CSC305	Operating System Lab					25	25	50

Syllabus:

Module	Detailed Content		Hours
1	**Operating system Overview**		4
	1.1	Introduction, Objectives, Functions and Evolution of Operating System	
	1.2	Operating system structures: Layered, Monolithic and Microkernel	
	1.3	Linux Kernel, Shell and System Calls	
2	**Process and Process Scheduling**		9
	2.1	Concept of a Process, Process States, Process Description, Process Control Block.	
	2.2	Uniprocessor Scheduling-Types: Preemptive and Non-preemptive scheduling algorithms (FCFS, SJF, SRTN, Priority, RR)	
	2.3	Threads: Definition and Types, Concept of Multithreading	
3	**Process Synchronization and Deadlocks**		9
	3.1	Concurrency: Principles of Concurrency, Inter-Process Communication, Process Synchronization.	
	3.2	Mutual Exclusion: Requirements, Hardware Support (TSL), Operating System Support (Semaphores), Producer and Consumer problem.	
	3.3	Principles of Deadlock: Conditions and Resource, Allocation Graphs, Deadlock Prevention, Deadlock Avoidance: Banker"s Algorithm, Deadlock Detection and Recovery, Dining Philosophers Problem.	
4	**Memory Management**		9
	4.1	Memory Management Requirements, Memory Partitioning: Fixed, Partitioning, Dynamic Partitioning, Memory Allocation Strategies: Best-Fit, First Fit, Worst Fit, Paging and Segmentation, TLB	
	4.2	Virtual Memory: Demand Paging, Page Replacement Strategies: FIFO, Optimal, LRU, Thrashing	
5		**File Management**	4
	5.1	Overview, File Organization and Access, File Directories, File Sharing	
6		**I/O management**	4
	6.1	I/O devices, Organization of the I/O Function, Disk Organization, I/O Management and Disk Scheduling: FCFS, SSTF, SCAN, CSCAN, LOOK, C-LOOK.	

Textbooks:	
1	William Stallings, Operating System: Internals and Design Principles, Prentice Hall, 8th Edition, 2014, ISBN-10: 0133805913 • ISBN-13: 9780133805918.
2	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley &Sons, Inc., 9th Edition, 2016, ISBN 978-81-265-5427-0
References:	
1	Achyut Godbole and Atul Kahate, Operating Systems, McGraw Hill Education, 3rd Edition
2	Andrew Tannenbaum, Operating System Design and Implementation, Pearson, 3rd Edition.
3	Maurice J. Bach, "Design of UNIX Operating System", PHI
4	Sumitabha Das, "UNIX: Concepts and Applications", McGraw Hill, 4th Edition

Assessment:	
Internal Assessment:	
Assessment consists of two class tests of 20 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 40% syllabus is completed. Duration of each test shall be one hour.	
End Semester Theory Examination:	
1	Question paper will comprise of 6 questions, each carrying 20 marks.
2	The students need to solve total 4 questions.
3	Question No.1 will be compulsory and based on entire syllabus.
4	Remaining question (Q.2 to Q.6) will be selected from all the modules

Useful Links	
1	https://swayam.gov.in/nd1_noc19_cs50/preview
2	https://nptel.ac.in/courses/117/106/117106113/
3	https://www.classcentral.com/course/swayam-introduction-to-operating-systems-6559

Lecture Plan : SEM_III-CSC305

Modes of Content Delivery:

i	Class Room Teaching	v	Self-Learning Online Resources	ix	Industry Visit
ii	Tutorial	vi	Slides	x	Group Discussion
iii	Remedial Coaching	vii	Simulations/Demonstrations	xi	
iv	Lab Experiment	viii	Expert Lecture	xii	

Term : Jan 10– 22Apr 2023 (UT1 : 1 March-3 March) (UT2 : 17Apr-19 Apr)

LECTURE PLAN:

Sr. No.	Topic Planned	Planned Date	Actual Date	Delivery Mechanisms
1.	Vision ,Mission of dept,Orientation towards NAAC	9/1/23	9/1/23	Board
2.	Course outcomes of operating system,exam scheme,introduction,functions,evolution of operating system	11/1/23	11/1/23	Board + PPT

3.	Kernel,types,shell,linux commands,system calls	12/1/23	12/1/23	Board + PPT
4.	Process and Program, Datastrcts related to Process in MM, Metadata of Process, PCB, Process Table, Process States	16/1/23	16/1/23	Board + PPT
5.	Lecture on : Process States	18/1/23	18/1/23	Board + PPT
6.	Lecture: Schedular and Types, Threads and Process	19/1/23	19/1/23	Board + PPT
7.	Lecture on: Types of Thread and their comparison, Intro. to Process Scheduling, FCFS	23/1/23	23/1/23	Board + PPT
8.	Lecture on : SJF and SRTF	25/1/23	25/1/23	Board + PPT
9.	Lecture on: Round Robin and Priority Algo(Premptive and Non premptive)	30/1/23	30/1/23	Board + PPT
10.	Lecture on : Multilevel Queue scheduling Algo and Multilevel Feedback Queue Scheduling Algo, Intro to Process Synchronization	1/2/23	1/2/23	Board + PPT
11.	Scheduling problem and Intro to process sync	2/2/23	2/2/23	Board + PPT
12.	Process Synchronization	6/2/23	6/2/23	Board + PPT
13.	Process Synchronization	8/2/23	8/2/23	Board + PPT
14.	Process Synchronization and Threads in OS	9/2/23	9/2/23	Board + PPT
15.	Mutual exclusion requirements,TSL	13/2/23	13/2/23	Board + PPT
16.	Semaphores,types	15/2/23	15/2/23	Board + PPT
17.	Producer consumer problem	16/2/23	16/2/23	Board + PPT
18.	DEadlock,resource allocation graphs,prevention	20/2/23	20/2/23	Board + PPT
19.	Deadlockavoidance,Banker's Algorithm	22/2/23	22/2/23	Board + PPT

20.	Deadlock detection and recovery,Dining Philosper problem	23/2/23	23/2/23	Board + PPT
21.	Memory management requirements,memory partitioning	28/2/23	28/2/23	Board + PPT
22.	Dynamic partitioning,strategies for memory allocation	6/3/23	6/3/23	Board + PPT
23.	Best fit,worst fit,first fit	9/3/23	9/3/23	Board + PPT
24.	Problems on best fit,first fit and worst fit	13/3/23	13/3/23	Board + PPT
25.	Virtual memoryPaging,address translation,TLB	15/3/23	15/3/23	Board + PPT
26.	Demand paging,thrashing	16/3/23	16/3/23	Board + PPT
27.	Segmentation,address translation	20/3/23	20/3/23	Board + PPT
28.	Page replacement policies FIFO,LRU,Optimal	23/3/23	23/3/23	Board + PPT
29.	Problems on FIFO,LRU,Optimal	27/3/23	3/4/23	Board + PPT
30.	File organization,access,file sharing	3/4/23	5/4/23	Board + PPT
31.	I/o functions,I/o organization	5/4/23	6/4/23	Board + PPT
32.	Disk organization,disk scheduling algorithms	6/4/23	10/4/23	Board + PPT
33.	FCFC,SSTF,SCAN,CSCAN,LOOK, CLOOK	10/4/23	12/4/23	Board + PPT
34.	Problems on disk scheduling	12/4/23	13/4/23	Board + PPT
35.		13/4/23	-	

Course Outcomes: [Target 2.5]

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

CO1	Understand the objectives, functions and structure of OS
CO2	Analyze the concept of process management and evaluate performance of process Scheduling algorithms.
CO3	Understand and apply the concepts of synchronization and deadlocks

CO4	Evaluate performance of Memory allocation and replacement policies
CO5	Understand the concepts of file management.
CO6	Apply concepts of I/O management and analyze techniques of disk scheduling.

Mapping of CO and PO/PSO

Relationship of course outcomes with program outcomes: Indicate 1 (low importance), 2 (Moderate Importance) or 3 (High Importance) in respective mapping cell.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CSC305.1	3	2			2								3
CSC305.2	3	2			2								3
CSC305.3	3	2			2								3
CSC305.4	3	2			2								3
CSC305.5	2	2			2								3
CSC305.6	2	2			2								3
TOTAL													
CO-PO MATRIX													

CO ASSESSMENT TOOLS

	Direct Methods (80%)					Indirect Methods (20%)
	Test 1	Test 2	Lab	Assignment	University Theory Result	(100%)
CSC604.1	10%	10%	15%	5%	60%	(100%)
CSC604.2	10%	10%	15%	5%	60%	(100%)
CSC604.3	10%	10%	15%	5%	60%	(100%)
CSC604.4	10%	10%	15%	5%	60%	(100%)
CSC604.5	10%	10%	15%	5%	60%	(100%)
CSC604.6	10%	10%	15%	5%	60%	(100%)

Rubrics for Assignments

Class : *S.E. AI & DS* **Semester : III**

Assignment No:	
Title:	
Date of Performance:	
Roll No:	
Name of the Student:	

Evaluation:

Indicator	**Very Poor**	**Poor**	**Average**	**Good**	**Excellent**
Timeline (2)	More than three sessions late (0)	More than two sessions late (0.5)	Two sessions late (1)	One session late (1.5)	Early or on time (2)
Organization (3)	N/A	Very poor readability and not structured (0.5)	Poor readability and somewhat structured (1)	Readable with one or two mistakes and structured (2)	Very well written and structured without any mistakes (3)
Level of content (3)	N/A	Major points are omitted or addressed minimally (0.5)	All major topics are covered, the information is accurate.(1)	Most major and some minor criteria are included. Information is Accurate (2)	All major and minor criteria are covered and are accurate. (3)
Depth of Knowledge(2)	N/A	One answer correct(0.5)	Two answers correct(1)	Three answers correct(1.5)	Four answers correct(2)

Department of AI & DS Engineering

Rubrics for assessment of Experiment:

Sr. No.		Exceed Expectation (EE)	Meet Expectation (ME)	Below Expectation (BE)
1.	On time submission Or completion (2)	Early or on time (2)	One session late (1)	More than one session late (0)
2.	Preparedness(2)	Awareness about experiment to be performed, Knows the basic theory related to the experiment very well. (2)	Managed to explain the theory related to the experiment. (1)	Not aware of the theory to the point. (0)
3.	Skill (4)	Structured and optimum performance (4)	Few steps are not appropriate (2)	Just managed (1)
4.	Documentation (2)	Lab experiment is documented in proper format and maintained neatly. (2)	Most of the report is documented in proper format but some formatting guidelines are missed. (1)	Experiments not written in proper format (0.5)