SEMESTER 5

CC-A5: OPERATING SYSTEM

Course code	CC-A5			
Category	Core Course			
Course title	**Operating System**			
Course ID	240/CS/CC501			
Scheme and Credits	L	T	P	Credits
	3	0	2	4
Theory Internal	25 marks			
Theory External	50 marks			
Practical Internal	5 marks			
Practical External	20 marks			
Total	100 marks			
Duration of Exam	3 hrs			

Note: The examiner will set nine questions in total. Question one will have Five parts from all units and the marks of first question will be of 20% of total marks of Question Paper and the remaining eight questions to be set by taking two questions from each unit and the marks of each question from Question no. 2 to 9 will be 20% of total marks of Question paper. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVES: The aim of the course is to provide knowledge of Operating System (OS) as a system program. Making student to learn about OS and linking OS as a powerful tool to make system work. Student will be able to learn types of OS and learn about system operations using OS.

COURSE OUTCOMES:

CO1: understand the basic concepts of operating systems and its services.

CO2: understand concept of process management and scheduling.

CO3: acquire knowledge of process synchronization along with deadlock handling.

CO4: learn about memory management and distributed operating system.

UNIT – I

Introductory Concepts: Operating System Functions and Characteristics, Historical Evolution of Operating Systems, Operating System Structure and Operations

Types of Operating System: Real time, Multiprogramming, Multiprocessing, Batch processing; Operating System Services, Operating System Interface, Methodologies for Implementation of Operating System, Service System Calls, System Programs.

UNIT – II

Process Management: Process Concepts, Operations on Processes, Process States and Process Control Block. InterProcess Communication; Multithreaded Programming: Multithreading Models, Threading Issues

CPU Scheduling: Scheduling Criteria, Levels of Scheduling, Scheduling Algorithms, Multiple Processor Scheduling; Algorithm Evaluation.

UNIT – III

Synchronization: Critical Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classical Problem of Synchronization, Monitors, Atomic Transactions

Deadlocks: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock 20 Avoidance, Deadlock Detection and Recovery.

UNIT – IV

Memory Management Strategies: Memory Management of Single-User and Multiuser Operating System, Partitioning, Swapping, Contiguous Memory Allocation, Paging and Segmentation

Virtual Memory Management: Demand Paging, Page Replacement Algorithms, Thrashing, Memory Mapped Files.

Distributed Operating Systems: Types of Network based Operating Systems, Network Structure, Design Issues;

Text Books:

[1] Silberschatz A., Galvin P.B.,and Gagne G., Operating System Concepts, John Wiley & Sons.

[2] Godbole, A.S., Operating Systems, Tata McGraw-Hill Publishing Company, New Delhi.

Reference Books:

[1] Deitel, H.M., Operating Systems, Addison-Wesley Publishing Company, New York.

[2] Tanenbaum, A.S., Operating System-Design and Implementation, Prentice Hall of India, New Delhi.

List of Practical:

1. Basics of UNIX
2. UNIX commands
3. Implementation of FCFS and SJF CPU scheduling algorithms
4. Implementation of Round Robin and Priority CPU Scheduling
5. Implementation of Producer-Consumer problem using semaphores
6. Implementation of FIFO Page Replacement Algorithms
7. Implementation of LRU Page Replacement Algorithms
8. Implementation of Sequential File Allocation Strategies
9. Implementation of Indexed File Allocation Strategies

VOC-2: GRAPHIC DESIGNING

Course code	VOC-2			
Category	Vocational Course			
Course title	**Graphic Designing**			
Course ID	240/CS/VO501			
Scheme and Credits	L	T	P	Credits
	3	0	2	4
Theory Internal	25 marks			
Theory External	50 marks			
Practical Internal	5 marks			
Practical External	20 marks			
Total	100			
Duration of Exam	3 HRS			

Note: The examiner will set nine questions in total. Question one will have Five parts from all units and the marks of first question will be of 20% of total marks of Question Paper and the remaining eight questions to be set by taking two questions from each unit and the marks of each question from Question no. 2 to 9 will be 20% of total marks of Question paper. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVES: The aim of this course is to introduces fundamental concepts of Computer Graphics with focus on modelling, rendering and interaction aspects of computer graphics. The course emphasizes the basic principles needed to design, use and understand computer graphics system.

Course Outcomes:

CO1: Develop a comprehensive understanding of computer graphics systems, including display devices, input methods, and their application across various domains.

CO2: Master 2D transformations (translation, scaling, rotation, reflection, shear) and viewing techniques, enabling precise manipulation and visualization of graphical objects.

CO3: Gain proficiency in representing 2D objects using polygonal and spline surfaces, and implementing basic illumination models for realistic rendering.

CO4: Acquire advanced skills in 3D transformations and viewing techniques, facilitating complex 3D scene creation and visualization.

UNIT-I

Introduction: Introduction to Graphics systems, Basic elements of Computer graphics, Applications of computer graphics. Architecture of Raster and Random scan display devices, input/output devices.

UNIT-II

Drawing and clipping primitives: Raster scan line, circle and ellipse drawing algorithms, Polygon filling, line clipping and polygon clipping algorithms.

UNIT-III

Transformation and Viewing: 2D and 3D Geometric Transformations, 2D and 3D Viewing Transformations (Projections- Parallel and Perspective), Vanishing points.

Geometric Modeling: Polygon Mesh Representation, Cubic Polynomial curves (Hermite and Bezier).

UNIT-IV

Visible Surface determination and Surface Rendering: Z-buffer algorithm, List-priority algorithm and area subdivision algorithm for visible surface determination. Illumination and shading models, RGB color model and Basics of Computer Animation.

Text Books:

[1] Baker, D.H. (2008). Computer Graphics. 2nd edition. Prentice Hall of India.
[2] Foley, J. D., Dam, A.V, Feiner, S. K., & Hughes, J. F. (1995). Computer Graphics: Principles and Practice in C. 2nd edition. Addison-Wesley Professional.

Reference Books:

[1] Bhattacharya, S. (2018). Computer Graphics. Oxford University Press
[2] Cohen, D. I. A. (2011). Introduction to Computer Theory. 2nd edition. Wiley India.
[3] Marschner, S., & Shirley, P. (2017) Fundamentals of Computer Graphics. 4th edition. CRC Press
[4] Rogers, D. F. (1989). Mathematical Elements for Computer Graphics. 2nd edition. McGraw Hill.

List of Experiment

1. Implementation of DDA Line Drawing Algorithm.
2. Implementation of Bresenham's Line Drawing Algorithm.

3. Implementation of Midpoint Circle Drawing Algorithm.
4. Implementation of Midpoint Ellipse Drawing Algorithm.
5. Implementation of Boundary Fill Algorithm.
6. Implementation of Flood Fill Algorithm.
7. Implementation of Scan-Line Polygon Filling Algorithm.
8. Implementation of Cohen–Sutherland Line Clipping Algorithm.
9. Program for 2D Translation.
10. Program for 2D Rotation.
11. Program for 2D Scaling.
12. Program for 2D Reflection.
13. Program for 2D Shearing