PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY KANURU, VIJAYAWADA

Department of Computer Science and Engineering

II B.Tech – II Semester

**Operating Systems(20CS3401)**

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| --- | --- | --- | --- | --- |
| **CO** | **Statement** | **Skill** | **Blooms** | **Units** |
| **CO1** | Understand the structure and functionalities of operating systems | Understand | L2 | 1, 2,3,4,5 |
| **CO2** | Apply different algorithms of CPU scheduling, Page replacement and disk scheduling. | Apply | L3 | 1,2,4,5 |
| **CO3** | Apply various concepts to solve problems related to process synchronization and deadlocks. | Apply | L3 | 1,3 |
| **CO4** | Analyse and interpret the functionalities of operating system. | Analyze,  Individual Performance, Communication | L4 | 2,3,4,5 |

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| **Design and Analysis of Algorithms** | | |
| **Unit No.** | **Contents** | **Mapped CO** |
| I | **Overview:** Introduction: What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Operating-System Structure, Operating-System Operations  **Operating System Structures:**  Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls. | **CO1,CO2,CO3** |
| II | **Process Management:** Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication.  **Threads:** Overview, Multi-core Programming, Multithreading Models.  **Process Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms (First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling.) | **CO1,CO2,CO4** |
| III | **Process Synchronization:** Background, The Critical-Section Problem, Peterson’s Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors.  **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. | **CO1,CO3,CO4** |
| IV | **Memory Management:**  **Main Memory:** Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table  **Virtual Memory:** Background, Demand Paging, Copy-on-Write, Page Replacement, Basic Page Replacement, FIFO Page  Replacement, Optimal Page Replacement, LRU Page Replacement, LRU-Approximation Page Replacement, Allocation of Frames, Thrashing. | **CO1,CO2,CO4** |
| V | **Storage Management:**  **File–System Interface:** File Concept, Access Methods, Directory and Disk Structure.  **File–System Implementation:** File-System Structure, File- System Implementation, Directory Implementation, Allocation Methods.  **Mass-Storage Structure**: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, FCFS Scheduling, SSTF Scheduling, SCAN Scheduling, C-SCAN Scheduling, LOOK Scheduling, Selection of a Disk-Scheduling Algorithm. | **CO1,CO2,CO4** |

**CO-PO Mapping**

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| **Contribution of Course Outcomes towards achievement of Program Outcomes** | | | | | | | | | | | | | | |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **CO1** | **√** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO2** | **√** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO3** |  |  |  |  |  |  |  |  |  |  |  |  | **√** |  |
| **CO4** |  | **√** |  |  |  |  |  |  | **√** | **√** |  |  |  |  |

**Strength of Correlation**

Distribution of marks weightage to PO’s through CO’s.

* The strength of correlation levels is based on percentage of marks distribution towards PO.

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| --- | --- | --- | --- |
| CIE | **Test** | **Test Number** | **Marks** |
| ObjectiveExam (10) | Objective Exam-1 | 10 |
| Objective Exam-2 | 10 |
| Assignment (5) | Assignment -1 | 5 |
| Assignment - 2 | 5 |
| DescriptiveExam (15) | Descriptive Exam - 1 | 15 |
| Descriptive Exam - 2 | 15 |

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| **CO** | **Skill** | **Blooms** | **Units** | **Assessing Tools can be used to measure CO (CIE)**  **Marks** | **Assessing Tools can be used to measure CO (SEE)**  **Marks** |
| CO1 | Understand | L2 | 1,2,3,4,5 | Objective Exam- 10 | 14 |
| CO2 | Apply | L3 | 1,2,4,5 | Descriptive Exam - 5 | 21 |
| CO3 | Apply | L3 | 1,3 | Descriptive Exam - 5 | 21 |
| CO4 | Analyze,  Individual Performance, Communication, | L4 | 2,3,4,5 | Descriptive Exam-10  Assignment - 5 | 14 |

**Strength of Correlation**

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| --- | --- |
| **% of marks towards PO through CO’s** | **Level (Weight)** |
| >=20% of total marks | 3 |
| >=10% and <20% of total marks | 2 |
| < 10% of total marks | 1 |

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| **CO** | **Skill** | **Bloom's** | **Units** | **Assessing tools can be used to measure CO (CIE) Marks** | **CIE-Total** | **Assessing tools can be used to measure CO (SEE) Marks** | **Total (CIE+SEE)** | **Percentage (%)** | **Strength of Correlation** | **PO/PSO** |
| **CO1** | Understand | L2 | 1,2,3,4,5 | Objective Exam- 10 | 10 | 14 | 24 | 24 | 3 | PO1 |
| **CO2** | Apply | L3 | 1,2,4,5 | Descriptive Exam - 5 | 5 | 21 | 26 | 26 | 3 | PO1 |
| **CO3** | Apply | L3 | 1,3 | Descriptive Exam - 5 | 5 | 21 | 26 | 26 | 3 | PSO1 |
| **CO4** | Analyze,  Individual Performance, Communication | L4 | 2,3,4,5 | Descriptive Exam-5  Assignment – 3  Individual Performance -1  Communication -1 | 8  1  1 | 14 | 22  1  1 | 22  1  1 | 3  1  1 | PO2,  PO9,  PO10 |

**Course Articulation Matrix:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)** | | | | | | | | | | | | | | |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| **CO1** | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO2** | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO3** |  |  |  |  |  |  |  |  |  |  |  |  | 3 |  |
| **CO4** |  | 3 |  |  |  |  |  |  | 1 | 1 |  |  |  |  |
| **Average** | 3 | 3 |  |  |  |  |  |  | 1 | 1 |  |  |  |  |