## BABU MADHAV INSTITUTE OF INFORMATION TECHNOLOGY, UTU – 2019

5 years Integrated M.Sc. (IT) – Semester 3
Lesson Planning
060010311 – CC8 Operating Systems

**Objective**: To familiarized with the knowledge of processes, memory management, I/O, scheduling algorithm and file systems of an operating system.

Course outcomes: Upon completion of the course, students shall be able to

CO1: Describe the roles and functionalities of operating system.
CO2: Describe the mechanism of File system along with types, operation and storage management.
CO3: Describe process concept and explain its scheduling algorithm.
CO4: Explain memory management concept and distinguish memory allocation policies.
CO5: Explain input output management concept and distinguish disk scheduling policies.
CO6: Describe and identify the problem of resource sharing and deadlock; choose prevention/detection methods for solving deadlock problem.
CO7: Explain need of mutual exclusion and apply critical section & semaphore concept to achieve it.

| Unit | Unit Name | Sub Unit | Topics | No. of Lectures | Reference Chapter/Additional Reading | Teaching Methodology |
|---|---|---|---|---|---|---|
| 1 | Introduction of Operating system, File System and management | 1.1 | A Real-Time Control Application | 1 | PC#1, Page No 3-5 | Presentation/Chalk and Talk |
| | | 1.2 | An Operational Overview, Process and Tools | 3 | PC #1, Page No 6-12 | |
| | | 1.3 | File Types and Operations, File Access Rights and Security Concerns | 3 | PC #2, Page No- 28-32 | |
| | | 1.4 | File Storage Management, The Root File System and Blocked Based File | 3 | PC #2, Page No 33-39 | |
| 2 | Process and Process Management | 2.1 | Programming and Time Sharing, Processor | 2 | PC #3, Page No 61-64 | Presentation/ Chalk and talk |
| | | 2.2 | Process States: Management Issues and A Queuing Model | 1 | PC #3, Page No 65-66 | |
| | | 2.3 | Scheduling: Scenarios and Scheduling Policy | 2 | PC #3, Page No 67-72 | |

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| | | 2.4 | Estimate Completion Time and Exponential Averaging Techniques | 1 | PC #3, Page No 72-74 | |
| | | 2.5 | Context Switched and Unix Process State Information | 1 | PC #3, Page No 74-77 | |
| 3 | Memory Management | 3.1 | Main Memory Management | 1 | PC #4, Page No 80-81 | Presentation/ Chalk and talk |
| | | 3.2 | Memory Relocation, Linking and Loading Concepts | 2 | PC #4, Page No 81-82 | |
| | | 3.3 | Process and Main Memory Management | 1 | PC #4, Page No 83 | |
| | | 3.4 | The First Fit and Best Fit Policy | 1 | PC #4, Page No 84-85 | |
| | | 3.5 | Fixed and Variable Partitions, Virtual Storage Space and Main Memory Partitions | 2 | PC #4, Page No 87-90 | |
| | | 3.6 | Paging: Implementation, Replacement and HW Support | 2 | PC #4, Page No 91-98 | |
| | | 3.7 | Segmentation | 1 | PC #4, Page No 98 | |
| 4 | Input Output Management | 4.1 | Issues in Input Output Management | 2 | PC #5, Page No 102 | Presentation/ Chalk and Talk |
| | | 4.2 | Input Output Organization: Programmed Data Mode, Polling, Interrupt and DMA Mode, Memory Mapped IO, Port-mapped IO and Logical Port-based IO | 2 | PC #5, Page No 104-114 | |
| | | 4.3 | Buffer Management, HW/SW Interface | 2 | PC #5, Page No 114-115 | |
| | | 4.4 | Disk Scheduling and Policies, The PCI Buses | 1 | PC #5, Page No 123 | |
| | | 4.5 | Universal Serial Bus: History, Classification of Devices and Modes of Communication | 2 | PC #5, Page No 125-127 | |
| 5 | Resource sharing and Management | 5.1 | Need for Scheduling | 1 | PC #6, Page N0 146 | Presentation/ Chalk and Talk |
| | | 5.2 | Mutual Exclusion | 2 | PC #6, Page No 147 | |
| | | 5.3 | Deadlocks and Its Prevention Method | 2 | PC #6, Page No 148-150 | |
| | | 5.4 | Deadlock Detection | 1 | PC #6, Page No 151-153 | |
| 6 | Mutual Exclusion | 6.1 | Mutual Exclusion Revisited | 2 | PC #6, Page No 154 | Presentation/ Chalk and Talk |
| | | 6.2 | Critical Sections | 1 | PC#6, Page No 154 | |
| | | 6.3 | Semaphores | 1 | PC#6, Page No 154 | |

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| | | 6.4 | Usage of Semaphores | 2 | PC#6, Page No 155 | |

**Text Book:**

1. Pramod Chandra P. Bhatt, An introduction to Operating Systems Concepts and Practice, PHI (PC)

**Reference Book:**

1. Silberschatz A., Galvin P. and Gagne G. Operating System Principles, Wiley. (SG)
2. Stallings W, Operating Systems: Internals and Design Principles, Pearson.
3. Tanenbaum A, Modern Operating Systems, PHI.

**Course objectives and course outcome mapping:**

Explore evolution, types, design and construct of an operating system: CO1, CO2, CO3, CO4, CO5, CO6

Implementation of processes, resource control, scheduling and files in operating system environment: CO1, CO2, CO3, CO6