

**SWARNANDHRA**  
**COLLEGE OF ENGINEERING AND TECHNOLOGY**  
**(AUTONOMOUS)**

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**DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS**

**TEACHING PLAN**

| Course Code | Course Title      | Year / Sem. | Branch | Contact Hr./ week | Academic Year | Date of Commencement of Semester |
|-------------|-------------------|-------------|--------|-------------------|---------------|----------------------------------|
| 20MC1T04    | Operating Systems | I/I         | MCA    | 6                 | 2024-25       | 26.08.2024                       |

**COURSE OUTCOMES:** Upon the successful completion of this course the student will be able

1. Understand the basics of operating systems like kernel, Shell, types and views of operating systems (K2)
2. Understand CPU scheduling algorithms and compare the results using Gantt chart. (K5)
3. Explain various memory management techniques and Concept of thrashing (K2).
4. Apply disk scheduling algorithms for better utilization of external memory (K3).
5. Understand the architecture of UNIX operating system (K1).

| Unit | OUTOCME<br>Blooms Level                                                           | TOPIC/ACTIVITY |                              | Text Book | Contact HOURS | Delivery Method    |
|------|-----------------------------------------------------------------------------------|----------------|------------------------------|-----------|---------------|--------------------|
| 1    | Understand the basics of operating systems like kernel, Shell, types and views of | <b>UNIT-I</b>  |                              |           |               | Chalk & Board, PPT |
|      |                                                                                   | 1.1            | Types of Operating Systems   | T1        | 1             |                    |
|      |                                                                                   | 1.2            | Operating Systems Concepts   | T1        | 1             |                    |
|      |                                                                                   | 1.3            | Operating System Operations  | T1        | 1             |                    |
|      |                                                                                   | 1.4            | Operating Systems Structures | T1        | 1             |                    |
|      |                                                                                   | 1.5            | Operating System Services    | T1        | 1             |                    |

|      |                                                                                     |            |                                      |    |   |                                 |  |
|------|-------------------------------------------------------------------------------------|------------|--------------------------------------|----|---|---------------------------------|--|
|      | operating systems (K2)                                                              | 1.6        | User Operating-System Interface      | T1 | 1 |                                 |  |
|      |                                                                                     | 1.7        | Introduction to System calls         | T1 | 1 |                                 |  |
|      |                                                                                     | 1.8        | Types of System Calls                | T1 | 1 |                                 |  |
| II   | Understand CPU scheduling algorithms and compare the results using Gantt chart.(K5) | UNIT – II  |                                      |    |   | Chalk & Board PPT, Video        |  |
|      |                                                                                     | 2.1        | Process concept                      | T1 | 1 |                                 |  |
|      |                                                                                     | 2.2        | Process State Diagram                | T1 | 1 |                                 |  |
|      |                                                                                     | 2.3        | Process control block                | T1 | 1 |                                 |  |
|      |                                                                                     | 2.4        | Process Scheduling                   | T1 | 1 |                                 |  |
|      |                                                                                     | 2.5        | Threads- Threading Issues            | T1 | 1 |                                 |  |
|      |                                                                                     | 2.6        | Scheduling- Basic Concepts           | T1 | 1 |                                 |  |
|      |                                                                                     | 2.7        | Scheduling Criteria                  | T1 | 1 |                                 |  |
|      |                                                                                     | 2.8        | Scheduling Algorithms                | T1 | 2 |                                 |  |
| III  | Explain various memory management techniques and Concept of thrashing (K2).         | UNIT – III |                                      |    |   | Chalk & Board PPT Demonstration |  |
|      |                                                                                     | 3.1        | The Critical-Section Problem,        | T1 | 1 |                                 |  |
|      |                                                                                     | 3.2        | Peterson’s Solution                  | T1 | 1 |                                 |  |
|      |                                                                                     | 3.3        | Synchronization Hardware             | T1 | 1 |                                 |  |
|      |                                                                                     | 3.4        | Semaphores                           | T1 | 1 |                                 |  |
|      |                                                                                     | 3.5        | Classic Problems of Synchronization  | T1 | 2 |                                 |  |
|      |                                                                                     | 3.6        | Monitors                             | T1 | 1 |                                 |  |
|      |                                                                                     | Mid I Exam |                                      |    |   |                                 |  |
|      |                                                                                     | 3.7        | Principles of deadlock: System Model | T1 | 1 |                                 |  |
|      |                                                                                     | 3.8        | Deadlock characterization            | T1 | 1 |                                 |  |
|      |                                                                                     | 3.9        | Deadlock handling                    | T1 | 1 |                                 |  |
|      |                                                                                     | 3.10       | Deadlock Prevention                  | T1 | 1 |                                 |  |
|      |                                                                                     | 3.11       | Detection and Avoidance              | T1 | 1 |                                 |  |
|      |                                                                                     | 3.12       | Recovery Starvation                  | T1 | 1 |                                 |  |
| 3.13 | Critical Regions form Deadlock                                                      | T1         | 1                                    |    |   |                                 |  |
|      |                                                                                     | UNIT – IV  |                                      |    |   |                                 |  |
|      |                                                                                     | 4.1        | Memory Management: Swapping          | T1 | 1 |                                 |  |
|      |                                                                                     | 4.2        | Contiguous Memory Allocation         | T1 | 1 |                                 |  |
|      |                                                                                     | 4.3        | Paging                               | T1 | 1 |                                 |  |

|     |                                                                                  |          |                                         |     |                                 |                                  |    |   |
|-----|----------------------------------------------------------------------------------|----------|-----------------------------------------|-----|---------------------------------|----------------------------------|----|---|
| IV  | Apply disk scheduling algorithms for better Utilization of external memory (K3). | 4.4      | structure of the Page Table             | T1  | 1                               | Chalk & Board PPT, Demonstration |    |   |
|     |                                                                                  |          | Segmentation Virtual Memory Management- | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.5      | Demand Paging                           | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.6      | Page-Replacement Algorithms             | T1  | 2                               |                                  |    |   |
|     |                                                                                  | 4.7      | Thrashing                               | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.8      | File-System Interface: File Concept     | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.9      | Access Methods                          | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.10     | Directory structure                     | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.11     | File-System mounting                    | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.12     | Files Sharing, Protection               | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.13     | File-System implementation              | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.14     | File-System Structure                   | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.15     | Allocation Methods                      | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.16     | Free-Space Management                   | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.17     | Disk Structure                          | T1  | 1                               |                                  |    |   |
|     |                                                                                  | 4.18     | Disk Scheduling                         | T1  | 1                               |                                  |    |   |
|     |                                                                                  | UNIT - V |                                         |     |                                 |                                  |    |   |
|     |                                                                                  |          | Understand the                          | 5.1 | Linux System: Design Principles |                                  | T1 | 1 |
| 5.2 | kernel Modules                                                                   |          |                                         | T1  | 1                               |                                  |    |   |
| 5.3 | Process Management                                                               |          |                                         | T1  | 1                               |                                  |    |   |
| 5.4 | File Systems                                                                     |          |                                         | T1  | 1                               |                                  |    |   |
| 5.5 | Input and Output                                                                 |          |                                         | T1  | 1                               |                                  |    |   |
| 5.6 | Interprocess Communication                                                       |          |                                         | T1  | 1                               |                                  |    |   |
| 5.7 | Network Structure                                                                |          |                                         | T1  | 1                               |                                  |    |   |
| 5.8 | Security                                                                         |          |                                         | T1  | 1                               |                                  |    |   |

|               |                                             |            |                                 |    |   |                   |
|---------------|---------------------------------------------|------------|---------------------------------|----|---|-------------------|
| V             | architecture of UNIX operating system (K1). | 5.9        | Windows7: Design Principles     | T1 | 1 | Chalk & Board PPT |
|               |                                             | 5.10       | System Components               | T1 | 1 |                   |
|               |                                             | 5.11       | Terminal Services and Fast User | T1 | 1 |                   |
|               |                                             | 5.12       | File System                     | T1 | 1 |                   |
|               |                                             | 5.13       | Networking                      | T1 | 1 |                   |
|               |                                             | 5.14       | Programmer Interface            | T1 | 1 |                   |
|               |                                             | MID EXAM 2 |                                 |    |   |                   |
| TOTAL CLASSES |                                             |            |                                 | 65 |   |                   |

### Recommended Text Books for Reading:

#### Text Books:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating system concepts, Edition 9, John Wiley & Sons, Inc., 2011
2. M. G. Venkatesh Murthy, Introduction to UNIX and Shell Programming, , Pearson, 2005
3. B.M. Harwani , UNIX & Shell Programming , OXFORD University Press, 2013

#### Reference Books:

1. W. Richard Stevens, Stephen Rago ,Advanced Programming in the UNIX Environment , , Wesley Professional, 2013
2. W. Richard Stevens,UNIX Network Programming , 1990
3. William stallings,,Operating systems, PHI/Pearson, 6/E, 2009
4. Dietal, Pearson ,Operating systems, Dietal, 3/e, 2007
5. Dhamdhere ,Operating systems, TMH, 2/e, 2009
6. B.M. Harwani,,UNIX & Shell Programming ,OXFORD University Press, 2013

#### Web Reference:

[https://onlinecourses.swayam2.ac.in/cec20\\_cs06/preview](https://onlinecourses.swayam2.ac.in/cec20_cs06/preview)

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