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|  | SHRI SOMESHWAR SHIKSHAN PRASARAK MANDAL’S  **SHARADCHANDRA PAWAR COLLEGE OF ENGINEERING & TECHNOLOGY, SOMESHWARNAGAR** | Record No:- |
| Revision:- |
| Date:- / / |



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| **TEACHING PLAN** |

**Department:** Computer Engineering **Academic Year:** 202 -202

**Semester:** I **Class:** T.E **Subject:** *System programming and Operating System*

**Date:**

**Teaching Scheme: Lectures/Week:** 03 **Practical/Week:** 04 **Tutorials/Week:** 00

**Examination Scheme: Insem:** 30 **Online:** NA **Endsem:** 70

| **Lect**  **No** | **Planned Date** | **Topics planned** | **References** | **Method used** | **Conducted Date** | **Sign of Faculty** |
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| 1 |  | Unit-1-IntroductionIntroduction to Systems Programming, Need of systems programming, Software Hierarchy |  | Chalk-Board |  |  |
| 2 |  | Types of software: system software and application software, Machine structure. |  | Chalk-Board |  |  |
| 3 |  | Evolution of components of systems programming: Text Editors, Assembler, Macros, Compiler, Interpreter, Loader, Linker, Debugger, Device Drivers, Operating System. |  | Chalk-Board |  |  |
| 4 |  | Elements of Assembly Language Programming: Assembly Language statements, Benefits of Assembly Language, A simple Assembly scheme |  | Chalk-Board |  |  |
| 5 |  | Pass Structure of Assembler. Design of two pass assembler: Processing of declaration statements, Assembler Directives and imperative statements |  | Chalk-Board |  |  |
| 6 |  | Advanced Assembler Directives, Intermediate code forms, Pass I and Pass II of two pass Assembler. |  | Chalk-Board |  |  |
| 7 |  | Unit-2- Macro Processor and CompilersIntroduction, Features of a Macro facility: Macro instruction arguments, Conditional Macro expansion |  | Chalk-Board |  |  |
| 8 |  | Macro calls within Macros, Macro instructions, Defining Macro |  | Chalk-Board |  |  |
| 9 |  | Design of two pass Macro processor |  | Chalk-Board |  |  |
| 10 |  | Concept of single pass Macro processor. |  | Chalk-Board |  |  |
| 11 |  | Introduction to Compilers: Phases of Compiler with one example |  | Chalk-Board |  |  |
| 12 |  | Comparison of compiler and Interpreter |  | Chalk-Board |  |  |
| 13 |  | Unit-3-Linkers and LoadersIntroduction, Loader schemes: Compile and Go, General Loader Scheme |  | Chalk-Board |  |  |
| 14 |  | Absolute Loaders, Subroutine Linkages, Relocating Loaders, Direct linking Loaders |  | Chalk-Board |  |  |
| 15 |  | Overlay structure, Design of  an Absolute Loader |  | Chalk-Board |  |  |
| 16 |  | Design of Direct linking Loader |  | Chalk-Board |  |  |
| 17 |  | Self-relocating programs |  | Chalk-Board |  |  |
| 18 |  | Static and Dynamic linking. |  | Chalk-Board |  |  |
| 19 |  | **Unit-4 -Operating System**  Introduction : Evolution of OS, Operating System Services, Functions of Operating System |  | Chalk-Board |  |  |
| 20 |  | Process Management : Process, Process States: 5 and 7 state model |  | Chalk-Board |  |  |
| 21 |  | Process control block,  Threads, Thread lifecycle |  | Chalk-Board |  |  |
| 22 |  | Multithreading Model, Process control system calls |  | Chalk-Board |  |  |
| 23 |  | Process Scheduling : Uni-processor Scheduling, Scheduling: Preemptive, Non-preemptive |  | Chalk-Board |  |  |
| 24 |  | Long term, Medium-term, Short term scheduling |  | Chalk-Board |  |  |
| 25 |  | Scheduling Algorithm: FCFS, SJF, RR, and Priority. |  | Chalk-Board |  |  |
| 26 |  | **Unit 5: Synchronization and Concurrency Control**  **Concurrency** : Principle and issues with Concurrency, Mutual Exclusion |  | Chalk-Board |  |  |
| 27 |  | Hardware approach,  Software approach, Semaphore |  | Chalk-Board |  |  |
| 28 |  | Mutex and monitor, Reader writer problem |  | Chalk-Board |  |  |
| 29 |  | Producer Consumer  problem, Dining Philosopher problem |  | Chalk-Board |  |  |
| 30 |  | Deadlock : Principle of Deadlock |  | Chalk-Board |  |  |
| 31 |  | Deadlock prevention, Deadlock avoidance |  | Chalk-Board |  |  |
| 32 |  | Deadlock detection, Deadlock recovery |  | Chalk-Board |  |  |
| 33 |  | **Unit 6: Memory Management :** IntroductionMemory Management concepts**,** Memory Management requirements |  | Chalk-Board |  |  |
| 34 |  | Memory Partitioning: Fixed Partitioning, Dynamic Partitioning, Buddy Systems Fragmentation |  | Chalk-Board |  |  |
| 35 |  | Paging, Segmentation, Address translation |  | Chalk-Board |  |  |
| 36 |  | Placement Strategies: First Fit, Best Fit, Next Fit and Worst Fit |  | Chalk-Board |  |  |
| 37 |  | Virtual Memory (VM): Concepts, Swapping, VM with Paging, Page Table Structure, Inverted  Page Table |  | Chalk-Board |  |  |
| 38 |  | Translation Look aside Buffer, Page Size, VM with Segmentation, VM with Combined paging and segmentation |  | Chalk-Board |  |  |
| 39 |  | Page Replacement Policies: First In First Out (FIFO), Last Recently Used(LRU), Optimal, Thrashing. |  | Chalk-Board |  |  |

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| **SUMMARY** | | | | |
| **Unit No.** | **Title** | **Total no. of Lectures** | **Planned Date of Completion** | **Actual Date of Completion** |
| 1 | **Introduction to Systems Programming** | **08** |  |  |
| 2 | Macro Processor and Compilers | **06** |  |  |
| 3 | **Linkers and Loaders** | **07** |  |  |
| 4 | **Operating System** | **07** |  |  |
| 5 | **Synchronization and Concurrency Control** | **07** |  |  |
| 6 | **Memory Management** | **07** |  |  |

**References:**

1. Leland Beck, “System Software: An Introduction to Systems Programming”, Pearson

**2.** John R. Levine, Tony Mason, Doug Brown, “Lex & Yacc”, 1st Edition, O’REILLY,

ISBN 81-7366-062-X

**3.** Alfred V. Aho, Ravi Sethi, Reffrey D. Ullman, “Compilers Principles, Techniques, and

Tools”, Addison Wesley, ISBN 981-235-885-4

**Methodology Used:**

**C /B**: Chalk & Board

**P:** Power point Presentation

**V/A:** Video Audio Lectures

**Subject In charge Head of the Department Principal**