



**Ahmedabad  
University**

|                    |  |                             |                                       |           |                      |     |                      |                      |     |                      |
|--------------------|--|-----------------------------|---------------------------------------|-----------|----------------------|-----|----------------------|----------------------|-----|----------------------|
| Course             | CSE340 Operating Systems   | Semester                    | Monsoon Semester 2024                 |           |                      |     |                      |                      |     |                      |
| Faculty Name(s)    | Susanta Tewari   | Contact                     | susanta.tewari@ahduni.edu.in          |           |                      |     |                      |                      |     |                      |
| School             | SEAS   | Credits                     | 3                                     |           |                      |     |                      |                      |     |                      |
| GER Category:      | Not Applicable   | Teaching Pedagogy Enable:NO | P/NP Course: Can not be taken as P/NP |           |                      |     |                      |                      |     |                      |
| Schedule           | <table> <tr> <td rowspan="2">Section 1</td><td>11:00 am to 12:30 pm</td><td>Tue</td><td>01-08-24 to 26-11-24</td></tr> <tr> <td>11:00 am to 12:30 pm</td><td>Thu</td><td>01-08-24 to 26-11-24</td></tr> </table>   |                             |                                       | Section 1 | 11:00 am to 12:30 pm | Tue | 01-08-24 to 26-11-24 | 11:00 am to 12:30 pm | Thu | 01-08-24 to 26-11-24 |
| Section 1          | 11:00 am to 12:30 pm   | Tue                         | 01-08-24 to 26-11-24                  |           |                      |     |                      |                      |     |                      |
|                    | 11:00 am to 12:30 pm   | Thu                         | 01-08-24 to 26-11-24                  |           |                      |     |                      |                      |     |                      |
| Prerequisite       | Not Applicable & CSC100 Introduction to Computer Programming   |                             |                                       |           |                      |     |                      |                      |     |                      |
| Antirequisite      | Not Applicable   |                             |                                       |           |                      |     |                      |                      |     |                      |
| Corequisite        | Not Applicable   |                             |                                       |           |                      |     |                      |                      |     |                      |
| Course Description | It is a foundation course in Computer Science to introduce basic concepts and internals of modern operating systems.   |                             |                                       |           |                      |     |                      |                      |     |                      |
| Course Objectives  | To explain basic functional units and building blocks of operating systems<br>To teach communications with peripheral devices and interrupt handling<br>To introduce how computer systems manage, interpret, and execute applications<br>To teach elements of system programming |                             |                                       |           |                      |     |                      |                      |     |                      |

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| Learning Outcomes            | <p>Be prepared for “system level” courses.</p> <p>Be able to learn the concepts and methods in designing various types of system software, how computer systems really work.</p> <p>Be able to learn practical hands-on experience in designing and implementing stand-alone and networked software using low-level system constructs.</p> <p>Be able to see the relationship between the stand-alone system software (traditional OS) and network software (distributed OS or network protocol suite)</p> <p>Be able to learn the concepts of computing as service and APIs.</p> <p>Be able to learn the relationships between computer architecture and system software.</p>  |
| Pedagogy                     | NPTEL Lectures  |
| Expectation From Students    | <p>Learn system programming</p> <ul style="list-style-type: none"> <li>- Understand basic principles of 'Operating Systems'</li> <li>- Understand 'internals of Operating Systems'</li> </ul>   |
| Assessment/Evaluation        | <ul style="list-style-type: none"> <li>• Mid-Semester Examination: <ul style="list-style-type: none"> <li>◦ Exam - 37.5%</li> <li>◦ Quiz - 25%</li> </ul> </li> <li>• End Semester Examination: <ul style="list-style-type: none"> <li>◦ Exam - 37.5%</li> </ul> </li> </ul>  |
| Attendance Policy            | As per Ahmedabad University Policy.   |
| Project / Assignment Details | N/A   |
| Course Material              | <p>Reference Book</p> <ul style="list-style-type: none"> <li>• Computer Systems: A Programmer's Perspective, Bryant and O'Hallaron, Second Edition, Pearson Education, ISBN: 978-0136108047, Year: 2010,</li> <li>• Operating System Concepts, Silberschatz, Galvin and Gagne, 8th Edition, John Wiley and Sons, ISBN: 9788126520510, Year: 2009,</li> <li>• UNIX System Programming, Keith Haviland, Dina Gray, Ben Salama, 2nd Edition, Addison-Wesley, ISBN: 978-0201877588, Year: 1998,</li> <li>• Advanced Programming in Unix Environment, Stevens R., 3rd Edition, PHI, ISBN: 978-0321637734, Year: 2013,</li> <li>• Linux Kernel Development, Robert Love, 1st Edition, Pearson Education, ISBN: 978-8131758182, Year: 2010,</li> </ul> |
| Additional Information       | NA  |



## Session Plan

| NO. | TOPIC TITLE  | TOPIC & SUBTOPIC DETAILS   | READINGS,CASES,ETC. | ACTIVITIES | IMPORTANT DATES |
|-----|--|--|---------------------|------------|-----------------|
| 1   | Week 1: Introduction to OS Abstractions, Systems Calls and Threads | Week 1: Introduction to OS Abstractions, Systems Calls and Threads |                     |            |                 |
| 2   | Week 1: Introduction to OS Abstractions, Systems Calls and Threads | Week 1: Introduction to OS Abstractions, Systems Calls and Threads |                     |            |                 |
| 3   | Week 2: X86 Processor Basics                                       | Week 2: X86 Processor Basics                                       |                     |            |                 |
| 4   | Week 2: X86 Processor Basics                                       | Week 2: X86 Processor Basics                                       |                     |            |                 |
| 5   | Week 3: Address Translation (Virtual Memory)                       | Week 3: Address Translation (Virtual Memory)                       |                     |            |                 |
| 6   | Week 3: Address Translation (Virtual Memory)                       | Week 3: Address Translation (Virtual Memory)                       |                     |            |                 |
| 7   | Week 4: Processes and Memory Allocation                            | Week 4: Processes and Memory Allocation                            |                     |            |                 |
| 8   | Week 4: Processes and Memory Allocation                            | Week 4: Processes and Memory Allocation                            |                     |            |                 |

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| 9  | Week 5: Processes and Memory Allocation (contd.)        | Week 5: Processes and Memory Allocation (contd.)        |  |  |  |
| 10 | Week 5: Processes and Memory Allocation (contd.)        | Week 5: Processes and Memory Allocation (contd.)        |  |  |  |
| 11 | Week 6: Process Creation, Modes, Stacks and Traps       | Week 6: Process Creation, Modes, Stacks and Traps       |  |  |  |
| 12 | Week 6: Process Creation, Modes, Stacks and Traps       | Week 6: Process Creation, Modes, Stacks and Traps       |  |  |  |
| 13 | Week 7: Context Switching , Multiprocessors and Locking | Week 7: Context Switching , Multiprocessors and Locking |  |  |  |
| 14 | break   | break   |  |  |  |
| 15 | Week 7: Context Switching , Multiprocessors and Locking | Week 7: Context Switching , Multiprocessors and Locking |  |  |  |
| 16 | Week 8: Abstracting Synchronization                     | Week 8: Abstracting Synchronization                     |  |  |  |
| 17 | Week 8: Abstracting Synchronization                     | Week 8: Abstracting Synchronization                     |  |  |  |
| 18 | Week 9: Abstracting Synchronization (contd.)            | Week 9: Abstracting Synchronization (contd.)            |  |  |  |

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| 19 | Week 9: Abstracting Synchronization (contd.) | Week 9: Abstracting Synchronization (contd.) |  |  |  |
| 20 | Week 10: Virtual Memory Swapping             | Week 10: Virtual Memory Swapping             |  |  |  |
| 21 | Week 10: Virtual Memory Swapping             | Week 10: Virtual Memory Swapping             |  |  |  |
| 22 | Week 11: Files and Disk I/O                  | Week 11: Files and Disk I/O                  |  |  |  |
| 23 | Week 11: Files and Disk I/O                  | Week 11: Files and Disk I/O                  |  |  |  |
| 24 | Week 12: Journaling Filesystem (Linux ext3)  | Week 12: Journaling Filesystem (Linux ext3)  |  |  |  |
| 25 | Week 12: Journaling Filesystem (Linux ext3)  | Week 12: Journaling Filesystem (Linux ext3)  |  |  |  |
| 26 | Exam Overview                                |  |  |  |  |

