CSC251 -Operating System Outline

GeneralInformation

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| **CourseNumber** | CSC-251-OperatingSystem |
| **CreditHours** | 4(TheoryCredit Hour=3,Lab CreditHour=1) |
| **Prerequisite** | None |
| **CourseInstructor** | Ms. Samreen Detho |

**CourseObjectives**

The main objectives of the course are to give students the basic concepts of an operating system, types of anoperating system, computer system structures, process management, CPU Scheduling, Processsynchronization, Deadlock, Memory management and Virtual memory management. Furthermore, thestudents will learn the operating system design algorithms often based on those used in existing commercialoperating systems. Our aim is to present these concepts and algorithms in general setting that are not tied tooneparticular operatingsystem.

**CatalogDescription**

**CSC-251**

**CourseContent**

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| **Week** | **Topics** | **SuggestedReading** |
| 1 | **Introductiontocourse**  What Operating Systems Do, Computer-System Organization,Computer-SystemArchitecture,Operating-SystemOperations,Resource Management, Security and Protection, Virtualization,DistributedSystems,KernelDataStructures,ComputingEnvironments | Chapter1 |
| 2-3 | **Operating-SystemStructures**  Operating-SystemServices,UserandOperating-System  Interface, System Calls, System Services, Linkers and Loaders, WhyApplications are Operating-System Specific, Operating-System Designand Implementation, Operating-System Structure, Building and BootinganOperatingSystem | Chapter2 |
| 4-5 | **Processes**  Process Concept, Process Scheduling, Operations on Processes,Interprocess Communication, IPC in Shared-Memory Systems, IPC inMessage-Passing Systems, Examples of IPC Systems, CommunicationinClient– ServerSystems | Chapter3 |
| 6 | **Threads&Concurrency**  MulticoreProgramming,MultithreadingModels,ThreadLibraries,ImplicitThreading,ThreadingIssues,Operating-SystemExamples | Chapter4 |
| 7 | **CPUScheduling** | Chapter5 |

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|  | Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multi-ProcessorScheduling, Real-Time CPU Scheduling, Operating-System Examples, AlgorithmEvaluation |  |
| 8 | **Synchronization Tools**  The Critical-Section Problem, Peterson’s Solution, Hardware Support forSynchronization, Mutex Locks,Semaphores, Monitors. | Chapter6 |
| 9 | **Midterm Examination** | |
| 10-11 | **Deadlocks**  System Model, Deadlock in Multithreaded Applications, Deadlock Characterization,Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance,DeadlockDetection,Recovery fromDeadlock. | Chapter8 |
| 12-13 | **MemoryManagement**  ContiguousMemoryAllocation,Paging,StructureofthePageTable,Swapping. | Chapter9 |
| 14 | **VirtualMemory**  DemandPaging,Copy-on-Write,PageReplacement, AllocationofFrames,Thrashing | Chapter10 |
| 15 | **Filesystemandstorage management**  File Concept, File Types, Disk Type, Access Methods, Directory Structure, andProtection | Chapter13 |
| 16 | **Revision** | - |
| **Final Examination** | | |

**TextBook**

Operating System Concepts 10th Edition by Abraham Silbetchatz, Peter Bare Galvin, and Greg Gagne. PublishedbyWilley

**ReferenceMaterial**

1. OperatingSystems: Principles andPractice2ndEdition by[ThomasAnderson,](https://www.amazon.com/s/ref%3Ddp_byline_sr_book_1?ie=UTF8&field-author=Thomas%2BAnderson&text=Thomas%2BAnderson&sort=relevancerank&search-alias=books)[MichaelDahlin](https://www.amazon.com/s/ref%3Ddp_byline_sr_book_2?ie=UTF8&field-author=Michael%2BDahlin&text=Michael%2BDahlin&sort=relevancerank&search-alias=books)
2. OperatingSystems: ThreeEasyPiecesBy[Remzi H.Arpaci-Dusseau](http://www.cs.wisc.edu/~remzi)and[AndreaC.Arpaci-Dusseau](http://www.cs.wisc.edu/~dusseau)

**CourseLearningOutcomes**

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|  | **CourseLearningOutcomes(CLO)** |
| 1 | Studentwillbeable toexplainthe fundamentalconceptsof OperatingSystems |
| 2 | Studentwill beableto design anddevelop thesolution forsomeknown problems |
| 3 | Based on performance evaluation criteria, student will be able to analyze the efficiency of well-knownalgorithms of operatingsystemsfor aparticularsituation and environment. |

**CLO-SOMap**

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|  | **SOIDs** | | | | | | | | | | | |
| **CLO ID** | **GA1** | **GA2** | **GA3** | **GA4** | **GA5** | **GA6** | **GA7** | **GA8** | **GA9** | **GA10** | **GA11** | **GA12** |
| CLO1 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CLO2 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CLO3 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Approvals**

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| Preparedby | Dr.AhmedWaqas |
| Approved by | NotSpecified |
| LastUpdate | 15February,2023 |
| UpdateHistory | ~~September7,2020~~ |