Institute / School Name	Chitkara Institute of Engineering and Technology/School of Computer Sciences		
Program Name	BE CSE		
Course Code	CSL4207		
Course Name	Operating System		
Lecture / Tutorial (per week)	3-1-0	**Course Credits**	**4**
Course Coordinator Name	Er. Dapinder Singh Virk		

1. Scope and Objectives of the Course

1. Operating system course is an essential part of any computer science education. The theory component will teach the students the concepts and principles that underlie modern operating systems, and relate theoretical principles with operating system implementation.
2. The course aims at providing a sound conceptual foundation with emphasis on Operating system architecture and its components.
3. The course attempts to familiarize students with the concepts of file system architecture, concurrent programming and various issues in the management of resources like processor, memory and input-output.
4. At the end of this course, students should be able to understand the operations performed by Operating System as a resource manager and various computer security issues and Operating System tools.

2. Textbooks

TB1: 'Operating System Concepts' by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Sixth Edition, John Wiley & Sons (ASIA) Pvt. Ltd.

3. Reference Books

RB1: 'Modern Operating Systems' by Andrew S. Tanenbaum, Second Edition, Prentice-Hall

RB2: 'System Programming & Operating Systems' by D.M. Dhamdhere, Second revised edition, Tata McGraw Hill

RB3: 'Operating Systems' by W. Stallings, Fifth edition, Prentice-Hall

4. Other readings and relevant websites

S.No.	Link of Journals, Magazines, websites and Research Papers
1	http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-828-operating-system-engineering-fall-2006/
2	http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Operating Systems/New_index1.Html
3	http://www.ics.uci.edu/~ics143/lectures.html
4	http://www.cs.kent.edu/~farrell/osf03/oldnotes/index.html
5	http://williamstallings.com/OS/OS6e.html

5. Course Plan

Lecture Number	Topics	Text Book / Reference Book / Other reading material	Page numbers of Text Book(s)
1	**Introduction:** Introduction to Operating systems, Types of Operating Systems- Mainframe systems, Desktop Systems	TB1 RB2	3-12 277-312
2	Types of Operating systems- Multiprocessor Systems, Distributed Systems, Clustered Systems, Real Time Systems, Handheld Systems	TB1 RB2	12-20 277-312
3-4	System Components, Operating System Services, System Calls/API, System Program	TB1	55-74
5-7	**Process Concept:** Process Scheduling, Operations On Processes, Cooperating Processes, Inter-process Communication	TB1 RB2 RB3	95-116 320-326, 447-453 108-140
8-9	**Threads**: Overview of Threads, Multithreading Models, Threading issues, Linux Threads	TB1 RB3	129-138, 144-145 161-174, 195-198
10-12	**CPU Scheduling:** Basic Concepts, Scheduling Criteria Scheduling Algorithms-, First In first Out Scheduling Algorithms (FIFO), Shortest Job First Scheduling Algorithms (SJF).	TB1 RB2 RB3	151-161 343-347, 406-416
13-15	Scheduling Algorithms- Priority Scheduling Algorithms, Round-robin Scheduling Algorithms, Multilevel Queue Scheduling, Multilevel Feedback Scheduling, Multiple-Processor , Scheduling Real Time Scheduling	TB1 RB2 RB3	161-171 347-368 417-432, 453-481
16-18	**Process Synchronization**: The Critical-Section Problem	TB1 RB2	189-197 396-432
ST-I (Syllabus covered from 1-18 lectures)			
19-20	Synchronization Hardware, Semaphores,	TB1	197-206
21-22	Classic problems of Synchronization, Critical regions, Monitors	TB1 RB2	206-222 396-432
23-25	**Deadlock:** System Model Deadlock Characterization, Methods for handling Deadlocks	TB1 RB2 RB1	143-250 371-395 168-173
26-28	Deadlock Prevention, Deadlock avoidance, Deadlock detection, Recovery From Deadlocks	TB1 RB1	250-265 168-183
29-30	**Memory Management:** Swapping, Paging	TB1 RB3	273-308 326-331
31-32	Segmentation ,Segmentation with paging	TB1	309-312
33-34	Virtual Memory, Demand Paging, Process creation,	TB1 RB1	317-330 202-222
35-36	Page Replacement Algorithms, Allocation of frames, Thrashing	TB1 RB1	330-353 202-222
ST-II (Syllabus covered from 19-36 lectures)			
37	**File Concept:** Access Methods, Directory Structure, File System Mounting,	TB1 RB1	379-406 382-398

	File Sharing, Protection	RB3	552-579
38	File System Structure, File System Implementation, Directory implementation, Allocation Methods, Free-space Management	TB1 RB1	411-433 399-428
39-40	Kernel I/O Subsystems, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management	TB1 RB1	472-478, 491-504 269-324
41	**Security:** Protection, Security Problem, User Authentication Problem, Program Threats, System Threats	TB1 RB1	657-671 584-650
42	**OS Case study –** • UNIX • LINUX • WINDOWS	RB1 Website TB1 TB1 RB1	672-756 Link 5 695-737 743-847 763-849
ST-III (Syllabus covered from 1-42 lectures)			

6. Syllabus with wheightage:

Topics	No. of Lectures	Weightage (%)
Introduction: Mainframe systems , Desktop Systems , Multiprocessor Systems , Distributed Systems ,Clustered Systems , Real Time Systems Handheld Systems System Components, Operating System Services, System Calls/API, System Program	4	17%
Process Concept: Process Scheduling, Operations On Processes, Cooperating Processes, Inter-process Communication	3	
Threads: Multithreading Models, Overview, Threading issues, Linux Threads	2	19%
CPU Scheduling: Basic Concepts, Scheduling Criteria Scheduling Algorithms Multiple-Processor, Scheduling Real Time Scheduling	6	
Process Synchronization: The Critical-Section Problem,	3	7%
Synchronization Hardware, Semaphores, Classic problems of Synchronization, Critical regions, Monitors	4	10%
Deadlock: System Model Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock avoidance, Deadlock detection, Recovery From Deadlocks	6	14%
Memory Management: Swapping, paging, Segmentation, Segmentation with paging	4	19%
Virtual Memory, Demand Paging, Process creation, Page Replacement Algorithms, Allocation of frames, Thrashing	4	
File Concept: Access Methods, Directory Structure, File System Mounting, File Sharing, Protection File System Structure, and File System Implementation, Directory implementation, Allocation Methods, Free-space Management,	2	14%
Kernel I/O Subsystems. Disk Structure – Disk Scheduling, Disk Management – Swap-Space Management	2	

Security: Protection, Security Problem, User Authentication Problem, Program Threats, System Threats **OS Case study** – UNIX, Linux, Windows	2	

7. Evaluation Scheme:

Component 2*	Sessional Tests (STs)*	40
Component 3**	End Term Examination**	60
	Total	**100**

***** There are three Sessional Tests (STs) for all theory papers. The average of best two will be considered.

****** The End Term Comprehensive examination will be held at the end of semester. The mandatory requirement of 75% attendance in all theory classes is to be met for being eligible to appear in this component.

This Document is approved by:

Designation	**Name**	**Signature**
Course Coordinator	Er. Dapinder Singh Virk	
Program Incharge	Er. Rupali Gill	
Deputy Dean	Er. Meenu Khurana	
Date	July 8, 2016	