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<b>OPERATING SYSTEMS</b> (Effective from the academic year 2018 -2019) <b>SEMESTER – IV</b>			
<b>Course Code</b>	<b>18CS43</b>	<b>CIE Marks</b>	40
<b>Number of Contact Hours/Week</b>	3:0:0	<b>SEE Marks</b>	60
<b>Total Number of Contact Hours</b>	40	<b>Exam Hours</b>	03
<b>CREDITS –3</b>			
<b>Course Learning Objectives:</b> This course (18CS43) will enable students to:			
<ul style="list-style-type: none"> <li>• Introduce concepts and terminology used in OS</li> <li>• Explain threading and multithreaded systems</li> <li>• Illustrate process synchronization and concept of Deadlock</li> <li>• Introduce Memory and Virtual memory management, File system and storage techniques</li> </ul>			
<b>Module 1</b>			<b>Contact Hours</b>
<b>Introduction to operating systems, System structures:</b> What operating systems do; Computer System organization; Computer System architecture; Operating System structure; Operating System operations; Process management; Memory management; Storage management; Protection and Security; Distributed system; Special-purpose systems; Computing environments. <b>Operating System Services;</b> User - Operating System interface; System calls; Types of system calls; System programs; Operating system design and implementation; Operating System structure; Virtual machines; Operating System generation; System boot. <b>Process Management</b> Process concept; Process scheduling; Operations on processes; Inter process communication <b>Text book 1: Chapter 1, 2.1, 2.3, 2.4, 2.5, 2.6, 2.8, 2.9, 2.10, 3.1, 3.2, 3.3, 3.4</b> <b>RBT: L1, L2, L3</b>			08
<b>Module 2</b>			
<b>Multi-threaded Programming:</b> Overview; Multithreading models; Thread Libraries; Threading issues. <b>Process Scheduling:</b> Basic concepts; Scheduling Criteria; Scheduling Algorithms; Multiple-processor scheduling; Thread scheduling. <b>Process Synchronization:</b> Synchronization: The critical section problem; Peterson’s solution; Synchronization hardware; Semaphores; Classical problems of synchronization; Monitors. <b>Text book 1: Chapter 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 5.5, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7</b> <b>RBT: L1, L2, L3</b>			08
<b>Module 3</b>			
<b>Deadlocks :</b> Deadlocks; System model; Deadlock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock. <b>Memory Management:</b> Memory management strategies: Background; Swapping; Contiguous memory allocation; Paging; Structure of page table; Segmentation. <b>Text book 1: Chapter 7, 8.1 to 8.6</b> <b>RBT: L1, L2, L3</b>			08
<b>Module 4</b>			
<b>Virtual Memory Management:</b> Background; Demand paging; Copy-on-write; Page replacement; Allocation of frames; Thrashing. <b>File System, Implementation of File System:</b> File system: File concept; Access methods; Directory structure; File system mounting; File sharing; Protection: Implementing File system: File system structure; File system implementation; Directory implementation; Allocation methods; Free space management. <b>Text book 1: Chapter 9.1. To 9.6, 10.1 to 10.5</b> <b>RBT: L1, L2, L3</b>			08

<b>Module 5</b>	
<p><b>Secondary Storage Structures, Protection:</b> Mass storage structures; Disk structure; Disk attachment; Disk scheduling; Disk management; Swap space management. Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights, Capability- Based systems.</p> <p><b>Case Study: The Linux Operating System:</b> Linux history; Design principles; Kernel modules; Process management; Scheduling; Memory Management; File systems, Input and output; Inter-process communication.</p> <p><b>Text book 1: Chapter 12.1 to 12.6, 21.1 to 21.9</b></p> <p><b>RBT: L1, L2, L3</b></p>	08
<p><b>Course Outcomes:</b> The student will be able to :</p> <ul style="list-style-type: none"> <li>• Demonstrate need for OS and different types of OS</li> <li>• Apply suitable techniques for management of different resources</li> <li>• Use processor, memory, storage and file system commands</li> <li>• Realize the different concepts of OS in platform of usage through case studies</li> </ul>	
<p><b>Question Paper Pattern:</b></p> <ul style="list-style-type: none"> <li>• The question paper will have ten questions.</li> <li>• Each full Question consisting of 20 marks</li> <li>• There will be 2 full questions (with a maximum of four sub questions) from each module.</li> <li>• Each full question will have sub questions covering all the topics under a module.</li> <li>• The students will have to answer 5 full questions, selecting one full question from each module.</li> </ul>	
<p><b>Textbooks:</b></p> <ol style="list-style-type: none"> <li>1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Principles 7<sup>th</sup> edition, Wiley-India, 2006</li> </ol>	
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Ann McHoes Ida M Fylnn, Understanding Operating System, Cengage Learning, 6th Edition</li> <li>2. D.M Dhamdhere, Operating Systems: A Concept Based Approach 3rd Ed, McGraw- Hill, 2013.</li> <li>3. P.C.P. Bhatt, An Introduction to Operating Systems: Concepts and Practice 4th Edition, PHI(EEE), 2014.</li> <li>4. William Stallings Operating Systems: Internals and Design Principles, 6th Edition, Pearson.</li> </ol>	