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| **NAME OF DEPARTMENT:** | | | | | | | | | | | | | | School of Computing | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | |
| **Subject Name:** | | | | | Operating System | | | | | | | | | | | | | | | | | | | | | | | **Subject Code:** | | | | | | | | TBC 404 | | |
|  | | | | |  | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | |
| **Course Name:** | | | | | Bachelor of Computer Applications (BCA) | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | |
|  | | | | |  | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | | |
| **1** | **Contact Hours:** | | | | | | | 45 | | | |  | | | | | | | | | | | | | | | | | | **L** | | 3 | | **T** | | 0 | **P** | 0 |
|  |  | | | | | | |  | | | |  | | | | | | | | | | | | | | | | | |  | |  | |  | |  |  |  |
| **2** | **Examination Duration (Hrs):** | | | | | | | | | | | | | | | |  | **Theory** | | | | | 0 | 3 |  | **Practical** | | | | | 0 | | 0 |  | | | | |
|  |  | | | | | | | | | | | | | | | |  |  | | | | |  |  |  |  | | | | |  | |  |  | | | | |
| **3** | **Relative Weightage:** | | | | | | | | |  | | | | **CWE:** | | | | | | | 25 | | **MTE:** | | | 25 | | | **ETE:** | | | 50 | | |  | | | |
|  |  | | | | | | | | |  | | | |  | | | | | |  | | |  | | |  | | |  | | |  | | |  | | | |
| **4** | **Credits:** | | 0 | | | 3 | |  | | | | | | | | | | | |  | | |  | | |  | | |  | | |  | | |  | | | |
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| **5** | **Semester:** | | |  | | | |  | | | \* | |  | | |  | | |  | | | | | | | | | | | | | | | | | | | |
|  |  | **Autumn** | | | | | | | **Spring** | | | | | | **Both** | | | | | | |  | | | | | | | | | | | | | | | | |
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| **6** | **Pre-Requisite:** | | | | | | | **Basic knowledge of Computers and software** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **7** | **Subject Area:** | | | | | | | Computer Application | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **8** | **Objective:** | | | | | | To familiarize students with the Concept of Operating System and its function (LINUX as a case study) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **9** | **Course Outcomes:** | | | | | | | | | | The student, on successful completion, will be able to: | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**CO1** Understand what an operating system is and what role it plays in a computer system.

**CO2** Understand the structure of operating systems and the services provided by operating systems.

**CO3** Understand the process and memory management done by OS.

**CO4** Understand how OS manages secondary storage available in a computer system.

**CO5** Understand how OS manages, access and stores files on secondary storage.

**CO6** Learn basic commands of LINUX/UNIX and shell scripting.

1. **Details of the Course:**

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| --- | --- | --- |
| **Sl.NO** | **CONTENT** | **CONTACT HOURS** |
| 1. | **Introduction:** Operating systems and its definition. History of Operating system. Types of operating system. Single-User, Multi-User, Multiprogramming, Multiprocessing, Batch Systems, Parallel, Distributed and Real-time systems.  Operating system structure and its services, System calls. | 9 |
| 2. | **Operating system components:** Process Management,Program and Process concept, PCB, Context Switching, Process scheduling, CPU scheduling criteria, Types of Schedulers, Scheduling algorithms, Multiple-processor scheduling, Threads. | 9 |
| 3. | **Process Synchronization and Deadlocks:** Independent and cooperative process, Inter process communication, Critical regions, The Critical-Section problem, Two process & multiple process solution, Peterson Algorithm, Bakery Algorithm, Semaphores, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock | 9 |
| 4. | **Memory and Storage management:** Memory Management-Logical and Physical Address Space, Contiguous and non-contiguous allocation, Paging, Virtual Memory, Demand paging and its performance, Page replacement algorithms.  File systems, secondary Storage Structure, File concept, access methods, directory implementation.  Disk structure, Disk scheduling methods, Disk management, Recovery,Protection and Security. | 9 |
| 5. | **LINUX Case Study:** Historical development of LINUX and its variants. Types of files in LINUX. Directory handling and Navigation. Absolute and Relative pathnames. File handling commands. Changing file permission. Shell Programming, command line arguments, Meta-characters. Shell variables, Test Command, The Logical and relational Operators, String handling and computation. | 9 |
|  | **TOTAL** | **45** |

**11. Suggested Books:**

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| --- | --- | --- |
| **Sl. NO** | **NAME OF AUTHORS/BOOKS/PUBLISHERS** | **YEAR OF PUBLICATION/REPRINT** |
| 1. | Silberschatz, Galvin: Operating System Concept, 7th Edition, John Wiley and Sons. | 2005 |
| 2. | William Stallings: Operating Systems: Internals and Design Principles, 7th Edition PHI. | 2012 |
| 3. | Sumitabha Das: UNIX Concepts and Application, 4th Edition, McGraw Hill | 2008 |