Lab CS-263 – Operating Systems Lab

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| **Form number** | COURSE OUTLINE / DOCUMENT | |
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| **Lab INSTRUCTOR INFORMATION** | **Name** | **Mr. Waqas Ali** |
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| **COURSE INSTRUCTOR**  **INFORMATION** | **Name** | **Dr. Farah Adeeba** |
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| **DEGREE INFORMATION** | **Program** | **Batch** | **Semester** | **Spring** |
| BSCS | 2021 to  2024 | **Year** | 2023 |

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| **COURSE INFORMATION** | **Course Category**  **C-** Core/ **E-**Elective | | **Code** | **Title** | **Credit hours** |
|  | | **CS--263** | **Operating Systems Lab** | **1** |
| **Prerequisite(s)** | |  | **Data Structures** |  |
| **TA**  **Required**  (Yes/ No) | **No. of TA(s)** | **Brief Justification** | | |
| No | 0 |  | | |

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| **TEXT BOOK(s) INFORMATION** | | **Title of Book** | | | *Operating System Concepts* | **Edition** |
| 8th |
| **Author(s)** | | | *Silberschatz* | |
| **Publisher** | | | *Prentice Hall* | |
| **Reference Book (s)** | | 1. | Title of Book | | *Modern Operating System, Author (s): Tenenbaum* | |
| 2. | Title of Book | | *Operating Systems, Author (s): William Stallings* | |
| **Support Material(s)** | a. | Three Easy Pieces by Remxi, Andera | | |
| b. |  | | |
| c. |  | | |
| d. |  | | |
| **Brief Descripton of Course:**  *(not more than 250 words)* | Operating System is a core course offered to BS CS. This course will cover the theoretical as well as practical knowledge of Operating System concepts. Major topics to be covered are Process Management, Thread Management, Process Synchronization, Deadlock management, Memory Management and File Management. Security and Distributed Operating Systems will be discussed subject to the availability of time. This is a programming intensive course and involves implementation and use of system calls, multithreaded applications, simulation of memory management, scheduling etc with a lot of emphasis on | | | | | |

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| **Course Objectives (CO): *(Brief & unambiguous)… at least 5 COs***   1. *tend to describe specific, discrete units of knowledge and skill* 2. *can be accomplished within a short time frame - still may be relevant for a class period* 3. *tend to be* ***STATEMENTS OF INTENT****; do not necessarily suggest that the behavior has been demonstrate* | |
| 1. | Understanding components of an operating system |
| 2. | Learning thread programming |

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| **Learning Outcome (LO): *(Brief & unambiguous-with reference to course objectives i.e. at least 5 LOs***   1. *describe broad aspects of behavior which incorporate a wide range of knowledge and skill* 2. *accomplished over time in several learning experiences* 3. *refer to* ***DEMONSTRATIONS OF PERFORMANCE*** | |
| a. | On the successful completion of this course, students should be able to understand operating system concepts. |
| b. | The students should be able to different aspects of operating systems. |
| c. | On the course completion, students should have ability to implement threads using a programming language. |
| e. | The students should have ability to collaborate and communicate efficiently in groups. |

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| **Courseware Structure: (Mark X where applies)** | | | | | | | | | |
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|  | ***Lecture***  ***(Lect)*** | ***Multimedia***  ***(MM)*** | ***Exercise (s)***  ***(Exer)*** | ***Labs***  ***(Lab)*** | ***Case Studies (CAS)*** | ***Assignment (s)***  ***(Assign)*** | ***Group Presentation (G-Pres)*** | ***Any other Medium*** |  |
| **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |
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| **Course Content:** | |
| **Weeks** | **Lab Contents/Topics** |
| ***Week-01*** | Introduction to Linux environment and setting up Ubuntu |
| ***Week-02*** | Basic commands to explore file structure of Ubuntu and editors overview |
| ***Week-03*** | Command Line Utilities, Shell, Commands |
| ***Week-04*** | Shell Scripting (Variables, Basic Scripting) + Quiz 1 |
| ***Week-05*** | Advanced Shell Scripting-Part-I |
| ***Week-06*** | Advanced Shell Scripting- Part-II + Quiz 2 (Shell Scripting) + Mid Project |
| ***Week-07*** | Process Creation Part-I (Fork () and Exec () and use of command line Arguments) |
| ***Week-08*** | Process Creation Part-II (Inter Process Communication (IPC) using pipes) + Quiz 3(Process) |
| ***Week-09*** | Threads, Thread Attributes |
| ***Week-10*** | CPU Scheduling Algorithms Implementation and Simulation (FCFS, RR, SJF, Priority)  + Term Project |
| ***Week-11*** | Threads Synchronization (Mutex & Condition Variables) |
| ***Week-12*** | Threads Synchronization (Semaphores) |
| ***Week-13*** | Threads Synchronization (Monitors) + Quiz 4 (Threads, Synchronization and Scheduling) |
| ***Week 14*** | Implementation and Simulation of Deadlock Avoidance Algorithms (Banker’s Algorithm) |
| ***Week-15*** | Page Replacement Algorithms Implementation and Simulation (FIFO, LRU and Optimal) |
| ***Week-16*** | Final Lab Exam/Project Evaluation |

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| **Grading Criteria** | | | |
|  | **ABSOLUTE Grading** | **X** | **RELATIVE Grading** |

# Marks Distribution: Planned Courseware Events:

**\****Weight Ranges as defined at NeON*

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| **Q U A L I F Y I N G**  **A T T E N D A N C E** |  | You must attend every class for your own personal benefit. Please refer to university policy of minimum attendance requirement (currently 3 absentees – 3 hrs (180 minutes) each class duration) .  Failing to conform qualifying attendance threshold, the student will stand debarred from sitting in the examination and assigned with “F” Grade. |
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| **Academic and Moral Integrity:** |  | 1. All assignments should be your own work (or your group’s when approved). PLAGIARISM will be awarded with “F” grade and/or reported to the University for academic and moral misconduct. To protect yourself, ALWAYS PROVIDE REFERENCES! 2. Missed quizzes/presentations/assignments will not be rescheduled. 3. Late/Copied assignments shall not be accepted and will result in deduction of marks already scored. |

# Instructions / Suggestions for STUDENTS for satisfactory progress in this course:

* On average, most students find at least three hours outside of class for each class hour necessary for satisfactory learning.
* Chapters should be read and homework should be attempted before class.
* You may contact me through email on email-id:to you within 24 hours.
* The homework assigned is a minimum. You should always work extra hours on your own.
* Use the few minutes you usually have before the start of each class to review the prior meetings’ notes and homework. This will save us valuable in-class time to work on new material.
* Develop a learning habit rather than memorizing; work in groups, whenever appropriate.
* Apply the learned principles and gained knowledge; be creative in thinking.
* **Assignments/ Activities:** They are not meant simply for grades, but to reinforce your learning. Assignments are due on time. Each day late will lower your assignment grade by 10%. Apart from value of content, spelling, grammar, punctuation, and good presentation (printing and paper quality) will figure into your assignment grade. To guard against errors, please keep copies of the papers you turn in and retain all graded assignments for your reference.

Your Assignments must include all the References. For this course you are highly encouraged to follow the Harvard style of referencing

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| **Signatories** | | **Name** | | | **Signature** | **Date** | | | | | | | | | | |
| **Teaching Faculty** | |  | | |  |  | |  | - |  |  | - |  |  |  |  |
| **Cluster Head** | |  | | |  |  | |  | - |  |  | - |  |  |  |  |
| **HOD** | |  | | |  |  | |  | - |  |  | - |  |  |  |  |
|  |  | **Approved** |  | **Not Approved** | | |  | | | | | | | | | |