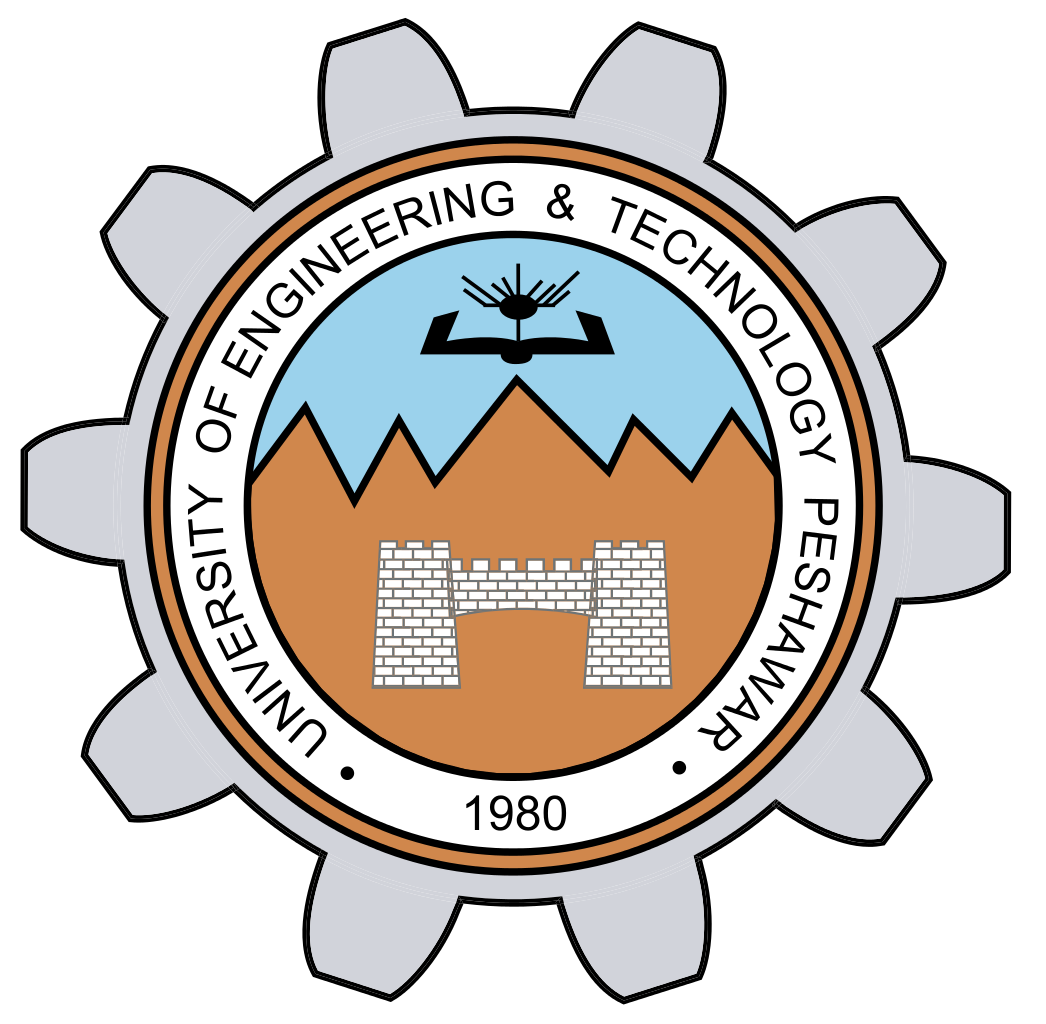
**DEPARTMENT OF COMPUTER SYSTEM ENGINEERING**

**UNIVERSITY OF ENGINEERING & TECHNOLOGY PESHAWAR**

Spring 2023

CSE 204L: Operating Systems Lab

Course Learning Objectives

1. **Course Outline:**

Introduction to Operating Systems, Process management: Concurrent processes and threads, Synchronization and mutual exclusion, Resource allocation and deadlock detection and prevention, scheduling. Linux environment, Shell scripting, Basic commands for files, Directories, Archiving and Searching. System calls, inter-process communications System and Shell Programming. Device drivers, Unix Programming Environment, Extensive programming in Linux environment using GCC.

1. **Weekly Course Outline:**

| **Week No.** | **Experiments** |
| --- | --- |
| 1 | Introduction to the UNIX  (Installation and File System) |
| 2 | Command Line Interface |
| 3 | SHELL Programming – Basics |
| 4 | SHELL Programming – Loops and Control Structures |
| 5 | Introduction to C Programming (GCC Compiler) |
| 6 | C Programming Practice |
| 7 | Process Creation and Execution |
| 8 | Multiprocessing |
| 9 | Threads Creation and Execution |
| 10 | Threads Synchronization |
| 11 | Simulation of Non-preemptive Process Scheduling Algorithms  FIFO, Priority |
| 12 | Simulation of Preemptive Process Scheduling Algorithms  Preemptive Priority |
| 13 | Simulation of Preemptive Process Scheduling Algorithms  Round Robin |
| 14 | Simulation of Banker’s Safety Algorithm |
| 15 | Simulation of Banker’s Algorithm for Deadlock Avoidance |

1. **Course Learning Outcomes:**

After completion of the course the student would be able to:

* **[CLO-1]** Make effective use of UNIX/Linux utilities and scripting languages using command line interface for performing better system administration tasks
* **[CLO-2]** Understand basic multiprocessing and multithreading concepts, develop and debug C programs using UNIX/Linux platforms for achieving higher performance in computing
* **[CLO-3]** Simulate algorithms using programming tools to master various process management concepts including scheduling, synchronization, deadlocks, system resources sharing among users

1. **Resources:**

* **Required textbook:** A. Silberschatz, P.B. Galvin & G. Gagne, Operating System Concepts, 7th Edition, John Wiley & Sons, Inc. 2004. (ISBN ISBN0-471-69466-5).
* **Highly recommended:** W. R. Stevens & S. A. Rago, Advanced Programming in the UNIX Environment, 2nd Edition, Addison-Wesley Professional Computing Series. 2005. (ISBN 0-201-43307-9).
* **Software Tools:**

Linux Operating System

1. **Mapping of CLOs:**

| **Course Assessment** | **CLOs** | | |
| --- | --- | --- | --- |
| **CLO 1** | **CLO 2** | **CLO 3** |
| **Lab Assignments** | **Y** | **Y** | **Y** |
| **Project** | **Y** | **Y** | **Y** |
| **Midterm Exam** | **Y** | **Y** |  |
| **Final Exam** | **Y** | **Y** | **Y** |