University of Asia Pacific (UAP)
Department of Computer Science and Engineering (CSE)

Course Outline

Program:	Computer Science and Engineering (CSE)
Course Title:	Operating System Lab
Course Code:	CSE 402
Semester:	Fall-2024
Level:	4th Year 1st Semester
Credit Hour:	1.5
Name & Designation of Teacher:	Tahira Alam, Assistant Professor Atia Rahman Orthi, Lecturer
Office/Room:	7th Floor
Class Hours:	
Consultation Hours:	Sunday: 2.00p.pm- 3.20 pm.
e-mail:	bidita@uap-bd.edu
Mobile:	+8801773117526
Rationale:	Required course in the CSE program
Pre-requisite (if any)**:**	None
Course Synopsis:	Introduction to operating systems concepts, process management, memory management, file systems, virtualization, and distributed operating systems. The laboratory exercises will include familiarization with UNIX system calls for process management and inter-process communication; Experiments on process scheduling and other operating system tasks through simulation/implementation. Finally, the students would require to apply the operating system concepts by experimenting on linux operating systems.
Course Objectives:	The objectives of this course are to:

1. **Teach** various operating system operations and functions.
2. **Explain** various scheduling, file management and memory allocation methods in real life applications and also learn applications of Linux operating system and apply these skills in real life.
3. **Demonstrate** various concepts and mechanisms related to operating systems.

Course Outcomes (CO) and their mapping with Program outcomes (PO) and Teaching-Learning Assessment methods:

CO No.	CO Statements: Upon successful completion of the course, students should be able to:	Corresponding POs (Appendix-1)	Bloom's taxonomy domain/level (Appendix-2)	Delivery methods and activities	Assessment Tools
CO1	**Describe** various operating system operations and functions	1	1/Understand	Live lecture, online multimedia presentation	Online Viva
CO2	**Implement** various scheduling, file management and memory allocation methods in real life applications and also learn applications of Linux operating system and apply these skills in real life.	3	1/Apply	Live lecture, Online multimedia presentation, Online problem solving	Online Lab exam
CO3	**Demonstrate** various concepts and mechanisms related to operating systems.	9	3/Responding	Live lecture, Online multimedia presentation	Online Presentation

Weighting COs with Assessment methods:

Assessment Type	% weight	CO1	CO2	CO3
Lab Final Exam	40	20	30	0
Assignment	40	-	40	-
Presentation	20	-	-	20
Total	100	20	70	20

Course Content Outline and mapping with Cos

Weeks	Topics / Content	Course Outcome	Delivery methods and activities	Reading Materials
1	Installing Linux operating System, operating dual port, User account management, Hardware set up and Trouble shooting	CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
2	Operating Linux command line interface, Opening terminal, Opening files, Changing directories, Creating folders and directories, Move/rename files.	CO1, CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
3	Operating Linux shell commands, Change file directory, Concatenation and print data, Spool file for line printing, Connecting to printer and/or other hardware, Remove jobs from the line printer queue, Print working directory.	CO1, CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
4	File systems and File permissions, Change file groups, Change file mode, Copy file data, Display file data in terminal, Find files, search in a file, Update access and modification times of a file	CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
5	Use of shell commands in detail, Writing fork programs and implementing various applications with fork, Writing a program which will retrieve information from a given file using stat	CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
6	Kernel configuration, compilation & installation + Reviews.	CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
7	**Mid Quiz (Online) + Viva**			
8	Using Linux shell scripts, Introduction to bash shell/program, Using Semaphore and practically using semaphores for synchronizing multiple processes.	CO1,CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides

9	Use of variable, string, array, conditions (if, else), loop and others.	CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
10	Implementation of a simple project using shell scripts.	CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
11	Writing program to simulate the following contiguous memory allocation techniques a) Worst-fit b) Best-fit c) First-fit	CO1,CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
12	Writing program to simulate the following non-preemptive CPU scheduling algorithms to find turnaround time and waiting time. a) FCFS b) SJF c) Round Robin d) Priority	CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
13	Writing program to simulate the following file allocation strategies. a) Sequential b) Indexed c) Linked.	CO2	Lecture, multimedia	Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition, Slides
14	**Final Exam**			

Minimum attendance: 70% class attendance is mandatory for a student in order to appear at the final examination.

Textbook: Operating System Concept Essentials, by Silbershatz, Galvin, and Gagne, 9th Edition

Required References: The Linux Programming Interface

Book by Michael Kerrisk

Recommended References: Linux/Unix | Guru 99

Grading System: As per the approved grading scale of University of Asia Pacific (Appendix-3).

Special Instructions: Students who will enter the class after the attendance call will be marked as absent.

Student's responsibilities: **1.**Students must come to the class prepared for the course material covered in the previous class(es).
2.They must submit their assignments on time.

Prepared by (Course Teacher)	Checked by (Chairman, PSAC committee)	Approved by (Head of the Department)

Appendix-1:

Washington Accord Program Outcomes (PO) for engineering programs:

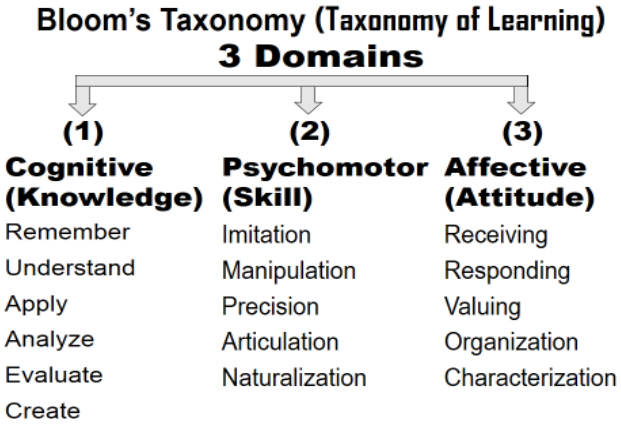
No.	PO	Differentiating Characteristic
1	Engineering Knowledge	Breadth and depth of education and type of knowledge, both theoretical and practical
2	Problem Analysis	Complexity of analysis
3	Design/ development of solutions	Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified
4	Investigation	Breadth and depth of investigation and experimentation
5	Modern Tool Usage	Level of understanding of the appropriateness of the tool
6	The Engineer and Society	Level of knowledge and responsibility
7	Environment and Sustainability	Type of solutions.
8	Ethics	Understanding and level of practice
9	Individual and Team work	Role in and diversity of team
10	Communication	Level of communication according to type of activities performed
11	Project Management and Finance	Level of management required for differing types of activity
12	Lifelong learning	Preparation for and depth of Continuing learning.

Generic Skills (Detailed):

1. **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems;
2. **Problem Analysis (T)** – Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;
3. **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues.

4. **Investigation (D)** Conduct investigation into complex problems, displaying creativeness, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
5. **Modern Tool Usage (A & D)** -Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations;
6. **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices.
7. **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development;
8. **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices.
9. **Communication (S)** -Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
10. **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
11. **Life Long Learning (S)** -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
12. **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one's own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities of entrepreneurship.

Appendix-2



Appendix-3
UAP Grading Policy:

Numeric Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75

70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00