

COURSE DESCRIPTION: CL-2006 Operating Systems Lab

COURSE DESCRIPTION FORM

INSTITUTION FAST School of Computing, National University of Computer and Emerging Sciences, Chiniot-Faisalabad Campus

PROGRAM TO BE EVALUATED

BS- Computer Science– Spring 2024

Course Description

Course Code	CL2006		
Course Title	Operating Systems Lab		
Credit Hours	1		
Prerequisites by Course(s) and Topics	Data Structures		
Grading Policy	Absolute grading		
Policy about missed assessment items in the course	Retake of missed assessment items (other than midterm/ final exam) will not be held. For a missed midterm/ final exam, an exam re-take/ pre-take application along with necessary evidence are required to be submitted to the department secretary. The examination assessment and retake committee will decide the exam re-take/ pre-take cases.		
Course Plagiarism Policy	Plagiarism in project or midterm/ final exam may result in F grade in the course. Plagiarism in an assignment will result in zero marks in the whole assignments category.		
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	50% Theory 50% Practical		
	Assessment Items		
	Assessment Item	Number	Weight (%)
	Lab Works	14	35
	Quiz	3	10
	Class Participation	3	03
	Project	1	12
	Final Exam	1	40
Lab Instructors (if any)	Ms. Momna Javaid, Ms. Aqsa Younas, Ms. Mahzaib Younas, Ms. Farwa Ahmad		
Course Coordinator	Ms. Momna Javaid		
URL (if any)			



Current Catalog Description	<ul style="list-style-type: none">- Scripting/programming in Ubuntu- How to program in an open source platform- Overview of process and thread creation, process synchronization and memory allocation- performance of various process scheduling and resource allocation & deadlock avoidance algorithms in Linux operating system.
Textbook (or Laboratory Manual for Laboratory Courses)	<ul style="list-style-type: none">- Operating System Concepts by Silberschatz, Prentice Hall, Ed. 10
Reference Material	<ul style="list-style-type: none">- Modern Operating System, Author (s): Tenenbaum- Operating Systems, Author (s): William Stallings

This may help you while preparing the course outline.

CLO	Course Learning Outcome (CLO) Statements	Domain	Taxonomy Level	GA	Tools
01	Apply the fundamental operating system concepts such as basic commands, shell scripting, process creation, inter-process communication, thread creation, thread attributes, process synchronization and memory allocation strategies in Linux operating system.	Cognitive	03		L-1, ----, L-11, L14, F
02	Examine the performance of different process scheduling and resource allocation & deadlock avoidance algorithms in Linux operating system.	Cognitive	04		L-12, L-13,F,P
Tools: A = Assignment, Q = Quiz, M = Midterm, F=Final, P=Presentation/Project					
B. Graduate Attributes					
GA1	Academic Education	To prepare graduates as computing professionals			
GA2	Knowledge for Solving Computing Problems	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.			✓
GA3	Problem Analysis	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.			✓



GA4	Design/Development of Solutions	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	
GA5	Modern Tool Usage	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.	
GA6	Individual and Team Work	Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.	
GA7	Communication	Communicate effectively with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.	
GA8	Computing Professionalism and Society	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.	
GA9	Ethics	Understand and commit to professional ethics, responsibilities, and norms of professional computing practice.	
GA10	Life-long Learning	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.	

Mapping of LLOs on GAS											
		GAS									
		1	2	3	4	5	6	7	8	9	10
LLOs	1		✓								
	2			✓							

Weeks	Topics to be covered and their mapping to CLOs		
	List of Topics	LLO	Assessment Tool
Week-01	Introduction to Linux environment and setting up Ubuntu	1	
Week-02	Basic commands to explore file structure of Ubuntu and editors overview	1	
Week-03	Shell Scripting (Variables, Arrays, Conditions, Loops)	1	
Week-04	Shell Scripting (Functions, Recursion) - Quiz 1	1	
Week-05	Process Creation Part-I (Fork () and Exec () , getpid, getppid())	1	
Week-06	<u>MID – I</u>		
Week-07	Process Creation Part-II (exit() and wait() system calls, implement orphan and zombie process)	1	
Week-08	Inter-Process Communication Part-I (Unnamed pipes)	1	
Week-09	Inter-Process Communication Part-II (Named pipes) - Quiz 2	1	
Week-10	Threads, Thread Attributes	1	
Week-11	Examine the performance of different CPU Scheduling Algorithms (FCFS, RR, SJF, Priority)	2	

Week -12	Threads Synchronization (Mutex and Condition Variables)		1	
Week 13	Implementation of Semaphores, Peterson’s Solution, Reader Writer Problem, Bounded Buffer Problem, Dining Philosopher Problem		1	
Week-14	Deadlock, Implementation of preventing deadlock, Banker’s Algorithm implementation and performance examine		2	
Week-15	Memory Allocation Strategies (First fit, Best fit, Worst fit) and Page Table implementation – Quiz 3		1	
Week-16	Project Viva			
Laboratory Projects/Experiments Done in the Course	Mentioned in Lab Course Description			
Programming Assignments Done in the Course				
Class Time Spent (in percentage)	Theory (%)	Problem Analysis (%)	Solution Design (%)	Social and Ethical Issues (%)
Oral and Written Communications				



Instructor Name: Momna Javaid

Instructor Signature:
Momna Javaid

Date: 14-03-2024

