COURSE DESCRIPTION FORM

INSTIT

UTION: National University of Computer & Emerging Sciences (FAST)

PROGRAM TO BE EVALUATED: BS CS

Course Description

Course Code	CL 2006
Course Title	Operating Systems Lab
Credit Hours	3+1
Prerequisites by Course(s) and Topics	Programming Fundamentals and Data structures
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	Midterms 20% Performance-based activities and Lab tasks 25% Assignments 5% Final Exam 50%
Course Coordinator	Engr. Abdul Rahman
URL (if any)	
Current Catalog Description	Linux system, Ubuntu installation, shell commands, shell scripting and programming, c programs in Linux, process creation, process management, inter-process communicationmethods message passing, named pipes, unnamed pipes, shared memory, kernel configuration, threads creation, threads attributes, multi-threads in open MP, kernel modules, kernel threads, file systems, semaphore, signals
Textbook (or **Laboratory Manual** for Laboratory Courses)	Linux: The Complete Reference, Sixth Edition. Manuals are uploaded on the above URL of google classroom
Reference Material	Handouts and useful websites URL by the instructor on google classroom
Course Goals	1. Introduction to operating system basics 2. New operating system and their differences with native os 3. Make students understand the core of system-level programs and processes

4. Make students able to create a small operating system or different mechanism to deal with hardware

A. Course Learning Outcome (CLOs):

CLO	Course Learning Outcome (CLO)	Domain	Taxonomy Level	PLO	Tools
01	Develop an understanding of basic LinuxOS, scripting, and process management activities.	Psychomotor	3	3	**LA, M**
02	Implement the kernel level programming and development process communication and synchronization.	Psychomotor	4	3	**LA, M, F**
03	Parallel Programming using different tools such as Pthread and OpenMP.	Psychomotor	5	5	**LA, F**

Tool: Lab Activities = LA, M = Midterm, F=Final,

B. Program Learning Outcome (PLOs):

PLO	Program Learning Outcome (PLO) Statement
03.	**Design/Develop Solutions:** Design solutions for complex computing problems and design systems, components, and processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
05.	**Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern computing tools, including prediction and modeling for complex computing problems.

C. Relation between CLOs and PLOs
(CLO: Course Learning Outcome, PLOs: Program Learning Outcomes)

	PLOs											
CLO	1	2	3	4	5	6	7	8	9	10	11	12
1			✓									
2			✓									
3					✓							
4												
5												

Topics Covered in the Course, with Number of Lectures on Each Topic (assume 15-week instruction and one-hour lectures)

Lab topics are related to the theory lectures covered separately.

Laboratory Projects/Experiments Done in the Course

Week	Course Contents/Topics	Lab Manual	CLO
01	**Lab 1:** Introduction to Linux & environment setup, Text editor, installations and VM creation.	1	1
02	**Lab 2:** Basic Linux Commands	2	1

	03	**Lab 3:** Shell Programming/Scripting	3	1
	04	**Lab 4:** Shell Programming/Scripting	3	1
	05	**Lab 5:** System Call related to Process Management	4	1,2
	06	**Lab 6:** Inter-Process Communication	5	1,2
	07	**Lab 7:** Kernel Configuration	6	1,2
	08	**Lab 8:** Mid Exam		
	09	**Lab 9:** Multithread Programming in Pthreads	7	3
	10	**Lab 10:** Git configuration and operation on Linux.	8	2,3
	11	**Lab 11:** Multithread Programming in OpenMP (shared memory)	9	3
	12	**Lab 12:** Semaphores in Linux	10	2,3
	13	**Lab 13:** Signals in Linux & Process Priority	11	2,3
	14	**Lab 14: Revisions**		
	15	**Lab 15:** Final Lab Exam		

Programming Assignments Done in the Course				
Class Time Spent on (In credit hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social and Ethical Issues**
	10 hours	14 hours	20 hours	4 hours
Oral and Written Communications	Every student is required to submit at least _written reports of typically _ pages and to make _ oral presentations of typically _ minute duration. Include only material that is			

	graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Instructor Name: Anaum Hamid

Instructor Signature:

Date 23-01-2023