Green University of Bangladesh

Department of Computer Science and Engineering

Course Outline

1 General Information

Faculty	Faculty of Science and Engineering (FSE)
Department	Department of Computer Science and Engineering (CSE)
Programme	Bachelor of Science in Computer Science and Engineering
Semester	**Spring 2023**
Course Title	*Operating System Lab*
Course Code	CSE 310
Course Credit	1.5 units
Contact Hours	2.5/week
Course Status	Core Course
Prerequisite Course	None

2 Course Instructors

Section	Name	Office	Email
201D5	Muhammad Abul Hasan	B305	muhammad.hasan@cse.green.edu.bd
202+203+211 EA	Mohammad Ehsan Shahmi Chowdhury	B509	test@gmail.com

3 Laboratory and Counseling Hours

Section	Room	Laboratory Weekday	Laboratory Time	Counseling Weekday	Counseling Time
201D5	C602	Thursday	08:30 AM - 11:30 AM	Friday	01:30 PM - 03:00 PM
202+203+211 EA	B803	Thursday	04:30 PM - 06:00 PM	Wednesday	10:00 AM - 11:30 AM

4 Course Rationale

Operating System Lab is a graduate-level introductory course that offers students experiential learning on the basic architecture of the Unix operating system. As well as developing and debugging programs with shell scripting, and implementing related algorithms so that the students can have adequate theoretical and practical understanding. This course describes the fundamental concepts behind operating systems such as resource management (e.g., CPU scheduling, memory) and examines the ways that design goals can be achieved.

5 Course Description

Operating system: This course will introduce the operating system concepts, shell scripting, Unix Commands, CPU Scheduling: FCFS, SJF scheduling algorithm, Memory Management: MFT, MVT, paging; Deadlock: resource allocation and deadlock avoidance; File Systems: files, directories; Capstone project development.

6 Teaching Methods

Lecture, Laboratory experiments, & Capstone Project developments.

7 Course Outcomes

CO	CO Description	PO	Domain (LoBT)	Weight	WK	WP	EA	Assessment Methods
CO1	Design various types of algorithms, theorems and methods in operating system to solve substantial problems including CPU scheduling algorithm, page replacement algorithms, process and file system management using system calls on UNIX platforms.	PO3	Cognitive (C5)	40%	WK5	WP1		Please refer to Section 8.
CO2	Apply Unix commands and shell programming on UNIX platforms to solve computing problems.	PO5	Psychomotor (P6)	45%	WK6	WP3, WP4		
CO3	Develop competencies for recognizing and using operating system algorithms and features.	PO12	Affective (A4)	15%	—			

Legend:

CO: *Course Outcome*
WK: *Knowledge Profile* (Appendix: B)
EA: *Complex Engineering Activities* (Appendix: D)
PO: *Program Outcome* (Appendix: A)
WP: *Complex Problem Solving* (Appendix: C)
LoBT: *Level of Bloom's Taxonomy* (Appendix: E)

8 Assessment Methods of COs

Assessment Method	CO1	CO2	CO3	Total
Lab Report	15%			15%
Continuous Lab Performance	15%	10%		25%
Capstone Project Presentation & Viva	15%	5%	10%	30%
Lab Final	30%			30%
Total	75%	15%	10%	100%

9 Lab Activity Outline

Class	Experiment Title	COs	Reference	Activities
1	Linux/Unix Commands for Beginners	2	Lab Manual, Experiment 1	Lab Experiment

2	Linux/Unix Commands - II	1	Lab Manual, Experiment 2	Lab Experiment
3	Shell Scripting - I	2	Lab Manual, Experiment 3	Lab Experiment
4	Shell Scripting - II	2	Lab Manual, Experiment 4	Lab Experiment
5	CPU Scheduling Algorithms to find Turnaround Time and Waiting Time	1	Lab Manual, Experiment 5	Lab Experiment
6	Simulating the MFT and MVT Memory Management Techniques	1	Lab Manual, Experiment 6	Lab Experiment
7	**Midterm Examination**	1, 2, 3		
8	Contiguous Memory Allocation Techniques	1	Lab Manual, Experiment 7	Lab Experiment
9	Page Replacement Algorithms	2	Lab Manual, Experiment 8	Lab Experiment
10	Thread Management	1	Lab Manual, Experiment 9	Lab Experiment
11	Semaphore	1	Lab Manual, Experiment 10	Lab Experiment
12	Resource Allocation Graph-Deadlock detection	1	Lab Manual, Experiment 11	Lab Experiment
13	Project Presentation	1, 2, 3		Presentation, Viva
14	**Final Examination**	1, 2, 3		Lab test, Viva

For the definitions of **T** and **R** , Please refer to Section 10.

10 Text and Reference Materials

T Textbook:

- *Abraham Silberschatz, Peter B. Galvin, & Greg Gagne*, **Operating System Concepts Essentials**, 10th Edition, Wiley, 2018.

R References:

- *William Stallings*, **Operating Systems: Internals and Design Principles**, 9th Edition, Pearson, 2018.

11 Grading Policy

Marks Obtained	Letter Grade	Numerical Evaluation	Definition
80% and above	A+	4.00	Excellent
75% <80%	A	3.75	Excellent
70% <75%	A-	3.50	Very Good
65% <70%	B+	3.25	Good
60% <65%	B	3.00	Good
55% <60%	B-	2.75	Good
50% <55%	C+	2.50	Average
45% <50%	C	2.25	Average
40% <45%	D	2.00	Below Average
below 40%	F	0.00	Failing

12 Additional Course Policies

1. **Lab Reports**: Report on previous Experiment must be submitted before the beginning of new experiment. A bonus may be obtained if a student submits a neat, clean and complete lab report.

2. **Examination**: There will be a mid-term exam and final exam both of which will be closed book.

3. **Unfair means policy**: In case of copying/plagiarism in any of the assessments, the students involved will receive zero marks. Zero Tolerance will be shown in this regard. In case of severe offences, actions will be taken as per university rule.

4. **Counseling**: Students are expected to follow the counseling hours posted. In case of emergency/unavoidable situations, students can e-mail me to make an appointment.

5. **Policy for Absence in Class/Exam**: If a student is absent in the class for anything other than medical reasons, he/she will not receive attendance. If a student misses a class for genuine medical reasons, he/she must submit an application with the supporting documents (prescription/medical report). He/she will then have to follow the instructions given by the instructor for make-up. In case of absence in the mid/final exam for medical grounds, the student must also get his/her application forwarded by the head of the department before a make-up exam can be taken. It is recommended that the students inform the instructor beforehand through mail if they feel that they will miss a class/evaluation due to medical reasons.

13 Additional Information

Please click or scan:

Academic Calendar Spring, 2023:

Academic Information and Policies:

Proctorial Rules:

Grading and Performance Evaluation:

Abida Sultana
Course Coordinator, CSE 310
September 18, 2023

Dr. Muhammad Aminur Rahaman
Chairman, Department of CSE
September 18, 2023

Appendix A : Program Outcomes

POs	Category	Program Outcomes
PO1	Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis	Identify, formulate, research the literature and analyze complex engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences.
PO3	Design/Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.
PO4	Investigations	Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
PO5	Modern tool usage	Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO7	Environment and sustainability	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics	Apply ethical principles and commit to professional ethics, responsibilities and the norms of the engineering practice.
PO9	Individual work and teamwork	Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.
PO10	Communication	Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.
PO11	Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.
PO12	Life Long Learning	Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.

Appendix B : Knowledge Profile

Knowledge Profile	Attribute
WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline
WK2	Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline
WK5	Knowledge that supports engineering design in a practice area
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline
WK7	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity; economic, social, cultural, environmental and sustainability

WK8	Engagement with selected knowledge in the research literature of the discipline

Appendix C : Range of Complex Engineering Problem Solving

Attribute	Identity	Complex Engineering Problem Description
Depth of knowledge required	WP1	Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6 or K8 which allows a fundamentals-based, first principles analytical approach
Range of conflicting requirements	WP2	Involve wide-ranging or conflicting technical, engineering and other issues
Depth of analysis required	WP3	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models
Familiarity of issues	WP4	Involve infrequently encountered issues
Extent of applicable codes	WP5	Are outside problems encompassed by standards and codes of practice for professional engineering
Extent of stakeholder involvement and conflicting requirements	WP6	Involve diverse groups of stakeholders with widely varying needs
Interdependence	WP7	Are high-level problems including many component parts or sub-problems

Note: Complex Engineering Problems have identity P1 and some or all of P2 to P7.

Appendix D : Range of Complex Engineering Activities

Attribute	Identity	Activity Description
Range of resources	EA1	Involve the use of diverse resources (and for this purpose resources include people, money, equipment, materials, information and technologies)
Level of interaction	EA2	Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues
Innovation	EA3	Involve creative use of engineering principles and researchbased knowledge in novel ways
Consequences for society and the environment	EA4	Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation
Familiarity	EA5	Can extend beyond previous experiences by applying principles-based approaches

Note: Complex activities means (engineering) activities or projects that have some or all of the above activities.

Appendix E : Domain and Level of Bloom's Taxonomy

Cognitive Domain		Psychomotor Domain		Affective Domain	
C1	Remembering	P1	Perception	A1	Receive
C2	Understanding	P2	Set	A2	Respond
C3	Applying	P3	Guided Response	A3	Value
C4	Analyzing	P4	Mechanism	A4	Organize
C5	Evaluating	P5	Complex Overt Response	A5	Internalize
C6	Creating/ Designing	P6	Adaption		
		P7	Origination		