Description of Course CSE 314

PART A: General Information

1	**Course Title**	: OPERATING SYSTEMS SESSIONAL
2	**Type of Course**	: THEORY
3	**Offered to**	: DEPARTMENT OF CSE
4	**Pre-requisite Course(s)**	: NONE

PART B: Course Details

1. Course Content (As approved by the Academic Council)

Operating system concepts: its role in computer systems, operating system structures, multiuser and multitasking OS; Process: process concepts, user and kernel threads, synchronization, inter-process communication, communication in client-server systems; CPU scheduling: scheduling criteria and algorithms, thread scheduling; Process synchronization: critical-section problem, semaphores, monitors; Deadlock: resource allocation and deadlock, deadlock detection, prevention and recovery; Memory management: swapping, paging, segmentation, virtual memory; Input/ Output: hardware, software, disk, terminals, clocks; File Systems: files, directories, security, protection; Multi Processor System: Multiprocessor OS types, multiprocessor synchronization and scheduling, case study of a multiprocessor system; Case study of some operating systems.

2. Course Objectives

The students are expected to:

i. Study different types of Process Management, Memory management and File management.
ii. Investigate reliability analysis of different types of systems and understand how to avoid and circumvent defects.
iii. Explore different types of methodologies of hardening systems.

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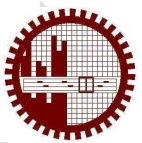

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3. Knowledge required

Technical

- Programming Language

Mathematics

- Programming Language

4. Course Outcomes (COs)

CO No.	CO Statement After undergoing this course, students should be able to:	Corresponding PO(s)*	Domains and Taxonomy level(s)**	Delivery Method(s) and Activity(-ies)	Assessment Tool(s)
CO1	**Understand and analyze** underlying notions of different components of Operating Systems	PO1, PO2, and PO7	C4	Lecture and Demonstration	Class Tests or Assignments or Projects, and Final Exam
CO2	**Develop** methodologies and **evaluate** different approaches used for Process, File and Memory management.	PO3, PO4 and PO6	C6, A3	Lecture, Demonstration, and hands-on	Class Tests or Assignments or Projects, and Final Exam
CO3	**Analyze** different techniques used for page replacement, Deadlock prevention, memory and file management.	PO5	C4, P6	Lecture, and hands-on	Class Tests or Assignments or Projects, and Final Exam

***Program Outcomes (POs)**

PO1: Engineering knowledge; PO2: Problem analysis; PO3: Design/development of solutions; PO4: Investigation; PO5: Modern tool usage; PO6: The engineer and society; PO7: Environment and sustainability; PO8: Ethics; PO9: Individual work and teamwork; PO10: Communication; PO11: Project management and finance; PO12: Life-long learning.

****Domains**

C-Cognitive: C1: Knowledge; C2: Comprehension; C3: Application; C4: Analysis; C5: Synthesis; C6: Evaluation
A-Affective: A1: Receiving; A2: Responding; A3: Valuing; A4: Organizing; A5: Characterizing
P-Psychomotor: P1: Perception; P2: Set; P3: Guided Response; P4: Mechanism; P5: Complex Overt Response; P6: Adaptation; P7: Organization

5. Mapping of Knowledge Profile, Complex Engineering Problem Solving and Complex Engineering Activities

COs	K1	K2	K3	K4	K5	K6	K7	K8	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5
CO1		√	√	√	√	√		√	√	√	√					√				
CO2		√	√	√	√	√		√	√	√	√				√	√		√	√	
CO3		√	√	√	√	√			√	√	√				√	√		√		√

K-Knowledge Profile:

K1: A systematic, theory-based understanding of the natural sciences applicable to the discipline; **K2:** Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline; **K3:** A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline; **K4:** 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; **K5:** Knowledge that supports engineering design in a practice area; **K6:** Knowledge of engineering practice (technology) in the practice areas in the engineering discipline;

K7: 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; **K8:** Engagement with selected knowledge in the research literature of the discipline

P-Range of Complex Engineering Problem Solving:

P1: 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; **P2:** Involve wide-ranging or conflicting technical, engineering and other issues; **P3:** Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models; **P4:** Involve infrequently encountered issues; **P5:** Are outside problems encompassed by standards and codes of practice for professional engineering; **P6:** Involve diverse groups of stakeholders with widely varying needs; **P7:** Are high level problems including many component parts or sub-problems

A-Range of Complex Engineering Activities:

A1: Involve the use of diverse resources (and for this purpose resources include people, money, equipment, materials, information and technologies); **A2:** Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues; **A3:** Involve creative use of engineering principles and research-based knowledge in novel ways; **A4:** Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation; **A5:** Can extend beyond previous experiences by applying principles-based approaches

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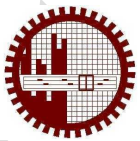

6. Lecture/ Activity Plan

Week	Lecture Topics	Corresponding CO(s)
Week 1	Bash Practice + Offline 1 (Bash) Declaration	CO1
Week 2	xv6 Lecture 1	CO1 and CO2
Week 3	Online 1 (on Bash) + Offline 1 Evaluation	CO1
Week 4	xv6 Lecture 2 + Offline 2 (xv6 System Call) Declaration	CO1 and CO2
Week 5	Offline 2 Evaluation	CO1 and CO2
Week 6	xv6 Lecture 3 + Offline 3 (xv6 Scheduling)	CO1, CO2, and CO3
Week 7	Online 2 (on Offline 3) + Offline 3 Evaluation	CO1, CO2, and CO3
Week 8	IPC Lecture + Offline 4 (IPC) Declaration	CO1, CO2, and CO3
Week 9	Reserved	
Week 10	Online 3 (on IPC) + Offline 4 Evaluation	CO1, CO2, and CO3
Week 11	xv6 Lecture 4 + Offline 5 (Memory Management) Declaration	CO1, CO2, and CO3
Week 12	Quiz	CO1, CO2, and CO3
Week 13	Online 4 (on Offline 5) + Offline 5 Evaluation	CO1, CO2, and CO3

7. Assessment Strategy

- Class Attendance: Class attendance will be recorded in every class.
- Online/ Offline Assignments: There will be 3-5 online or offline assignments.
- Final Quiz: A comprehensive Final Quiz will be held at the end of the semester as per the institutional ordinance.

8. Textbook/ Reference

Modern Operating System, 4th Edition (by Andrew S Tanenbaum)

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