Description of Course: CSE 203

PART A: General Information

1. **Course Title** : Operating System and Unix Programming
2. **Type Of Course** : Theory
3. **Offered To** : Department Of IoT And Robotics Engineering
4. **Pre-Requisite Course(S)** : Object Oriented Programming

PART B: Course Details

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

Introduction: Definition, Types of Operating Systems, Functions of Operating System. services, system components, System call. **Process Managemen**t: Process Concept. Process Scheduling. Inter process communication, CPU Scheduling Criteria, Scheduling algorithm, Multiple Processor Scheduling. **Real time Scheduling**. Algorithm evolution. Process Synchronization and deadlocks: The Critical Section Problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, **Dead locks** - system model, Characterization, Deadlock prevention, avoidance and detection, Recovery from deadlock, Combined approach to deadlock handling. **Memory management**: Functions, single contiguous, Partitioned memory management: multiple relocatable partitioned memory management, paging segmentation, demand paging virtual memory management. **File Management**: Concept, access methods, directory structures, allocation methods, free space management, secondary storage structure. Disk Management: Disk Structure & Scheduling methods, Disk management, Swap - Space management.

2. Course Objectives

a. This course is designed to enable the student to use the UNIX operating system.
b. Topics include basic commands, compilers, editors, text processors, shell and AWK programming, file system organization and basic system administration.

3. Knowledge required: No

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)
1.	**Explain** the concepts of OS, the basic principles used in the design of modern operating systems and processes, threads and mechanisms for synchronization, deadlock, management.	PO1	C5	Lectures, tutorials	Slides, Quiz
2.	**Explain** the basic concepts of POSIX standards, UNIX & POSIX API for UNIX operating system, UNIX File, File System, UNIX Kernel support for files and different types of APIs	PO1	C5	Lectures, tutorials	Slides, Quiz
3.	**Analyze** the concepts of processes/threads and process/thread Control, process relationships, signal handling mechanism, daemon characteristics coding rules and error logging IPC issues and techniques in UNIX system programming.	PO1	C4	Lectures, tutorials	Slides, Quiz

***Program Outcomes (POs)**
PO(a): Engineering knowledge; PO(b): Problem analysis; PO(c): Design/development of solutions; PO(d): Investigation; PO(e): Modern tool usage; PO(f): The engineer and society; PO(g): Environment and sustainability; PO(h): Ethics; PO(i): Individual work and teamwork; PO(j): Communication; PO(k): Project management and finance; PO(l): 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

CO	K1	K2	K3	K4	K5	K6	K7	K8	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5
1			□																	
2			□																	
3			□																	

6. Lecture/ Activity Plan

Week	Topic	Course Outcomes
Week 01 (Lecture 01)	Introduction and Operating System Concepts.	CO1, CO3
Week 02 (Lecture 02)	Unix Programming	CO1, CO3
Week 03 (Lecture 03)	Unix Programming	CO1, CO3
Week 04 (Lecture 04)	Processes and Threads	CO1, CO3
Week 05 (Lecture 05)	I/O and Deadlock	CO1, CO3
Week 06 (Lecture 06)	Memory Management	CO1, CO3
Week 07 (Lecture 07)	Memory Management	CO1, CO3
Week 08 (Lecture 08)	Multiple Processor Systems	CO2, CO3
Week 09 (Lecture 09)	File Systems	CO2, CO3
Week 10 (Lecture 10)	File Systems	CO2, CO3
Week 11 (Lecture 11)	Security	CO2, CO3
Week 12 (Lecture 12)	Virtualization and Cloud	CO1, CO3
Week 13 (Lecture 13)	Network and Distributed Systems	CO1, CO3
Week 14 (Lecture 14)	Operating System Design	CO1, CO3

7. Assessment Strategy

Class Attendance: Class attendance will be recorded in every class.

Continuous Assessment: Continuous assessment of any of the activities such as class participation, quizzes, assignment, presentation, etc. The scheme of the continuous assessment for the course will be declared on the first day of classes.

Mid-term Examination: A comprehensive mid-term examination will be held at the mid of the term (according to academic calendar) following the guideline of Academic Council.
Final Examination: A comprehensive final examination will be held at the end of the term (according to the academic calendar) following the guideline of the Academic Council.

8. Distribution of Marks

Criterion	Marks
Attendance	10%
Quizzes	10%
Class Test 01 (Before Mid)	10%
Class Test 02 (Before Final)	10%
Mid Term	24%
Final Exam	36%
Total	**100%**

9. Textbook/ Reference

a. Modern Operating Systems, 5th edition Published by Pearson (May 29, 2022) C2023, Andrew S. Tanenbaum rije University, Amsterdam, The Netherlands Herbert Bos
b. Operating System Concepts, Tenth Edition, Avi Silberschatz, Peter Baer Galvin, Greg Gagne John Wiley & Sons, Inc., ISBN 978-1-118-06333-0, Face the Real World of Operating Systems Fully Equipped
c. Embedded Linux Systems with the Yocto Project, Ist edition, Published by Pearson (May 2, 2016) C 2016, Rudolf J. Streif

Course Teacher(s):

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