



Department of Computer Science

College of Science

University Of Salahaddin

Subject: - operating systems

Course Book second course – (Year -4- CS & IT)

Lecturer's name: - (MSc) Lana Latif Nahmatwlla

Academic Year: 2023/2024

Course Book

1. Course name	Operating Systems
2. Lecturer in charge	Lana Latif Nahmatwlla
3. Department/ College	Computer/College Of Science
4. Contact	e-mail: lana.nahmatwlla@su.edu.krd
5. Time (in hours) per week	Theory: 2
6. Office hours	Office hours (for students): Thursday (12 – 2)
7. Course code	
8. Teacher's academic profile	<p>Teaching:</p> <ul style="list-style-type: none"> - Attended OOP labs in 2015 as a teaching assistant - Attended Computer science labs in 2014 as a teaching assistant - Attended Programming Language labs in 2011 as a teaching assistant - Attended OS labs in 2011 as a teaching assistant - Attended data structure labs in 2011 as a teaching assistant - Attended data based Labs in 2014 <p>Research interest: My research interest is in Operating Systems</p> <p>Supervision: I am currently supervising 2 fourth year students' project. Their project title is "3D LIGHT SYSTEM "</p> <p>Past Projects: My MSc project was on "Pipelined Parallel Processing Implementation based on Distributed Memory Systems"</p>
9. Keywords	Kernel, shell ,System Calls ,System Boot ,System Programs, process, Multithreaded, CPU Scheduler, Disk Scheduling, File Sharing, Co-operating Processes. File Management, Multitasking
10. Course overview:	OS purposes: resource management and the extended virtual computer; historical development. Processes: critical sections and mutual exclusion, semaphores,

monitors, classical problems, deadlock; process scheduling. Input and Output: hardware and software control. Memory management: multi-programming; swapping; virtual memory, paging and segmentation; File System: operations, implementation, and performance. Operating System Security and Protection mechanisms: protection domains, access lists, capability systems, principle of minimum privilege, security threats and attacks, encryption. This course introduces students to a broad range of operating system concepts, including installation and maintenance. Emphasis is operating system concepts, management, maintenance, and resources required. Linux and Unix Operating system are so important to be studied because this operating system are used in world in wide range because of their security, free cost of the operating system and open source. The course will cover all the concept of programming of Shell Programming and how to create directory and open files by using Unix.:

11. Course objective:

- Students will demonstrate a knowledge of process control, threads, concurrency, memory management scheduling, I/O and files, distributed systems, Security, networking.
- To provide a general explanation of the component of operating systems
- To provide the general organization of the computer systems and the relation between the computer structure and operating systems.

12. Student's obligation .

- There will be two main theoretical and practical exams plus a number of quizzes in the lab. The quizzes will be calculated as one exam mark.

13. Forms of teaching

- Using power point and data show.
- Using White board , Videos and images

14. Assessment scheme

Assessments:-

Semester exam

Theoretical exam will be out of 15

- **Second Semester exam**

Examinations

- Final exam **Theoretical** %50

15. Student learning outcome:

In the end of the course student should be able to

- Describe the general architecture of computers and describe, contrast and compare differing structures for operating systems
- Understand and analyse theory and implementation of: processes, resource control, physical and scheduling, I/O and files.
- Be familiar with multithreading.
- Students will understand the concepts of memory management including virtual memory
- Be familiar with protection and security mechanisms.
- Help students understand the Operating System for Mobile and some kinds of Mobile Applications
- understanding the issues that related to file and implementation, disk management
- Be familiar with various types of operating systems including Linux
- comfortably use basic Linux commands from the command line (from a terminal window);
- usefully combine Linux tools using features such as filters, pipes, redirection, and regular expressions;
- be knowledgeable enough about basic Linux shell scripting to be able to successfully read and write bash shell scripts;
- Know how to use Linux resources to find additional information about Linux commands.

16. Course Reading List and References:

1. Abraham Silberschatz .,Operating System Concept. 7ed. USA: John Wiley & Sons, Inc. 2005.
2. Abd-El-Barr. and H. El-Rewini, Fundamentals of Computer Organization And Architecture. New Jersey: John Wiley & Sons, Inc, 2005.

Other relevant papers, websites and books.

17. The Topics:

Lecturer's name

<ol style="list-style-type: none"> 1. CPU Scheduler 2. Basic Concepts 3. CPU Scheduler 4. Dispatcher 5. Scheduling Criteria 6. Scheduling Algorithms 7. Multiple-Processor Scheduling 8. Multicore Processors 9. Simple Memory Management System 10. Binding of Instructions and Data to Memory 11. Swapping 12. Memory partitions 13. Fragmentation 14. Paging 15. Segmentation 16. Memory protection 17. Disk Structure 18. Disk Scheduling 19. Disk Management 20. Boot Block 21. File Concept 22. File Attributes 23. File Operation 24. Open Files 25. Directory Structure 26. File Sharing 27. Standard Security attacks 28. Security measure levels 29. Program Threats 30. System and Network Threats 31. Definition of protection 32. Goals of protection 33. I/O systems 34. Introduction 	<p>1st Week</p> <p>2nd Week</p> <p>3rd Week</p> <p>4th Week & 5th Week</p> <p>6th week & 7th Week</p> <p>8th week & 9th Week</p> <p>10th Week , 11th week & 12th week</p> <p>13th Week, 14th week & 15th Week</p>
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<p>35.Performance 36.Operating System for Mobile 37.Mobile Applications 38.Virtual Memory 39.Background 40.Demand Paging 41.Copy-on-Write 42.Page Replacement 43.Allocation of Frames 44.Thrashing 45.Memory-Mapped Files 46.Allocation Kernel Memory 47.Other Consideration 48.Operating System Examples</p> <p>Exam</p>	
<p>19. Examinations:</p> <p>1. Compositional:-</p> <p>-What is System Calls? -What are the advantages and disadvantages of Multiprocessor Systems? -What is context switch? Briefly Explain?</p> <p>2. True or false type of exams:-</p> <p><i>Determine whether the following statements are true or False and Correct the false one.</i></p> <ol style="list-style-type: none">1. System calls provide the interface between a process and the operating system.2. In Asymmetric multiprocessing (AMP) each processor is self-scheduling. <p>3. Write A shell Program To Greet Based On Time of the System.</p>	
<p>20. Extra notes:</p>	
<p>21. Peer review</p>	<p>پیداچونہوہی ھاوہل</p>