



ICS 431 “Operating Systems”

Week 1.1

Course Introduction

Dr. Tarek Helmy El-Basuny

Outline of Today's Class

- We will introduce the course outlines and agree on the coordination issues.
 - My contact data,
 - Setting the office hours,
 - Course information,
 - Notes for class attendance,
 - References of the Course,
 - Course objective and learning outcomes,
 - Grading policies, and the proposed dates of the major exams,
 - Topics we are going to cover during the course,
 - Topics to be covered during the intensive introduction of the Operating Systems (OS).

Contact Data and Office Hours

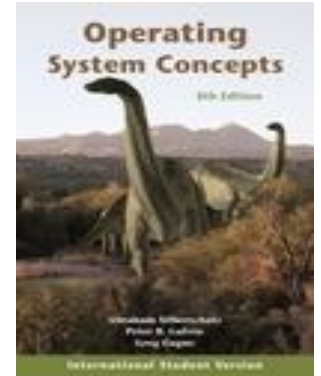
- **My email address is:** helmy@kfupm.edu.sa,
- **My office Location is:** Building # 22, Room # 137-3,
- **My office Tel. is:** 1967,
- **Classes will be conducted on:** Sunday, Tuesday, and Thursday.
 - **Sec. 1,** from 10:00 to 10:50 am, in building # 24, room # 165.
 - **Sec. 2,** from 12:00 to 12:50 am, in building # 24, room # 153.
- I will open the door for you to attend in either of these two periods if you can't attend in your section's time due to an acceptable apology.
- The LAB: Mon. & Wed. from 03:30 to 06:10 pm, 22-336-2
- **Office Hours:**
 - Sunday, Tuesday, Thursday, from 12:50 to 1:45 pm, or
 - You may arrange with me for a meeting by phone or email.

Course Information

- Course Name is: Operating Systems, Course Code is: ICS 431, it is 4 credits (3-3-4).
- **It is a loosely coordinated course.**
 - **Every section will have its own quizzes**, but grading policy, topics breakdown, synchronized level of questions in the quizzes will be coordinated.
 - **Major and final Exams will be common for both sections.**
 - There are programming and theoretical assignments with a weight of **20%** of the course grade. In the assignments, you will practice **selective** exercises and programming assignments of the OS topics, **some may not be covered in the lecture** for breadth coverage.
- Pre-requisite Course:
 - ICS 232/233 (Computer Organization and Assembly Programming)
- Pre-requisites by Topics:
 - Linux and C programming language awareness are required for the programming assignments.
 - Linux Mint and C programming toolkit are installed on the machines of the OS Lab (Building 22-Room 336). You may practice using these SWs during the first three weeks in the lab or you can download and install them on your machine.
 - Fundamentals of data structure for developing lab assignments,
 - Algorithms and problem-solving,
 - Computer Organization and Assembly Programming.

References of the Course

- **Main Text Book:** Operating Systems Concepts, 9th Edition Silberschatz, Galvin, Gagne , 2014
- Topics presented in the classes should be your main reference.
 - We may elaborate more on some topics than the text book.
 - We may cover some concepts that are not exist in the text book.
 - We will cover more exercises about the topics than the text book.
 - Text book exercises are very important for HWs, quizzes and exams.
- **Other References of the Course**
 - Modern Operating Systems, **Andrew S. Tanenbaum**, 4th Edition, 2014, Prentice Hall.
 - Distributed Operating Systems, **Tanenbaum Andrew**, <http://www.e-reading.me/book.php?book=143358>
 - Reading **articles** and **information** from other books and Websites are recommended.



Important notes for Class Attendance

- Attendance will be taken at the **end** of the class by circulating the attendance sheet. **That will start by the third class after finishing the period of add/drop classes.**
- You will have about **four** absences **FREE** of charge.
- Each subsequent absence, up to the **ninth** absence, is worth **-0.5** percentage point of your overall score.
- After **ten** absences **without any excuses, you** will automatically assigned **DN** grade (**according to the university regulation**).
- An **unexcused absence** will become an **excused one ONLY** by an official letter from the student's affair office.

Course Contents/Schedule

Week/s	Chapter/s	Topic
1-2	1	Intensive Introduction to Operating Systems (6 hours).
2-3	2	Operating System Structure (2 hours).
3-4	3	Processes management (3 hours)
4-5	4	Multi-threads management (3 hours)
5-6	5	Process Scheduling (6 hours)
7	6	Process Synchronization (1 hour + self study)
8-9	7	Deadlocks (4 hours)
9-10	8	Memory Management (4 hours)
10-11	9	Virtual Memory (4 hours)
11-12	10	File System Interface (3 hours).
12-13	11	File System Implementation (3 hours).
13-14	12, 13	I/O Systems and Mass Storage Structure (3 hours).
14-15	14, 15	System Protection and Security (3 hours)

Collaborative Environment

- We would like the course to run smoothly and to be enjoyable for you.
 - Help each other to understand the OS fundamentals.
 - Be supportive and collaborative with me and with your colleagues.
 - Feel free to ask about any ambiguous concepts during the class.
- Feedback, by email or in person, always welcome.
 - Feel free to let me know what you find just good or bad about the course.
- I am really in your side and doing my best to help you.
 - Do not miss-interpret the democratic way of interaction.
 - I can handle criticism or difference of opinions friendly.
 - Your honest **course-related feedbacks** will be highly appreciated and implemented.

Active Learning Strategies

- **In the Passive Learning/Instructor-Centered:** The students are just receiving information and ideas from the instructor.
- **In the Active Learning/Student-Centered:** The students should be involved in doing, observing, self learning, and giving feedback. **So that, you need to:**
 - Read the materials before coming to the class.
 - Engage in the class and discuss about the presented topics.
 - You may be asked to summarize/write one minute paper of what we said at the end of the class.
 - You may be asked to answer some questions.
 - We will try to use animation, simulation or role play to facilitate some topics.
 - **As a motivation**, you will be pounced by actively participating in the classes, this is a chance to make up the quizzes and exams.
 - **Your feedback about some issues will be highly appreciated: i.e.**
 - What kind of questions and topics should be covered in the exams in a way that we keep the standard quality of learning outcomes.
 - Time of the exams and quizzes.

Grading Policies with Details

<ul style="list-style-type: none"> ❑ Theoretical exercises and programming assignments (some of them might be from the text book) will be posted through the BB account of your Lab's Section. • You need to monitor the posting and due dates of each assignment. Notifications/emails will be sent after posting each assignment. • YOU NEED TO SUBMIT <u>PRINTED HARDCOPY OF YOUR SOLUTION</u> TO ME DURING THE CLASS OR THE OFFICE HOURS BEFORE THE DUE DATE. • <u>Handwriting of your solution will be favored and pounced.</u> • No late submission will be accepted. • There is a lab component of the course. You can use the lab machines by yourself (<u>Building 22 - Room 336-2</u> on M/W from 03:30-06:10 pm) to practice and solve the programming assignments. • Your existence for practicing is recommended. 	20 %
<ul style="list-style-type: none"> ❑ Quizzes; at least 3, we may have 4 quizzes and select the best three (Attendance & active class discussion can make up your performance in quizzes). 	10 %
<ul style="list-style-type: none"> ❑ Major Exam I: around Week # 6 and will be common for the two Sections. • The exam will be conducted on (Sat. 29th of Feb., from 7:30 pm to 9:30 PM) • Location, Material TBA in the BB and in the classroom. 	20 %
<ul style="list-style-type: none"> ❑ Major Exam II: around Week # 11 and will be common for the two Sections. • The exam will be conducted on (Sat. 4th of April, from 8:00 pm to 10:00 pm), • Location, Material TBA in the BB and in the classroom. 	25 %
<ul style="list-style-type: none"> ❑ Final Exam: Tuesday 5th of May (80% material after Exam II and 20% comprehensive) 	25 %

Course Objectives & Learning Outcomes

- **Objectives:** The objectives of this course are:
 - Introduce the fundamental concepts and principles of operating systems.
 - Expose students to popular operating systems (Unix/Linux and Windows) components .
 - Provide hands-on experience through operating systems exercises and programming assignments carried out in the lab's assignments.
- **Learning outcomes:** by the end of this course you will be able to:
 - Recognize operating system types and structure.
 - Implement processes and threads in an operating system.
 - Analyze different CPU scheduling algorithms.
 - Identify and handle deadlocks.
 - Identify process synchronization techniques and implement some of them.
 - Recognize OS support for main memory, virtual memory, disk scheduling, I/O systems, and file systems.
 - Implement inter-process communication.
 - Identify security and protection issues in computer systems.
 - Use C and the Linux shell script to develop programs.

Let me hear from you

- Before getting into the introductory sessions of the OS, let me know!
- What do you recommend for us to run the course in an enjoyable way?
- What do you expect to learn in this course?
- Are you ready for active learning environment?

During the Intensive OS Introduction

- We will introduce the computer System's Component,
- We will introduce different definitions and views of the OS,
- We will introduce the basic computer system organization and operation,
- We will introduce the major Operating Systems (OS) types,
- We will introduce the services an OS provides to users, processes, and other systems.
- We will introduce the common OS components,
- We will introduce the storage hierarchy structure in the computer systems,
- We will introduce caching features & problems and how the OS deals with?
- We will introduce the computing models and the OS support,
- We will introduce multiprocessor and multiprocessing systems,
- We will introduce the OS support to multi-processing systems,
- We will introduce real time and embedded OSs,
- We will introduce the interrupts, exceptions and how does the OS handle?
- We will introduce different I/O structures and techniques,
- We will introduce the security and protection issue of system's resources by the OS,
- We will introduce the system calls, the system programs how does the OS handle?
- We will introduce various ways of structuring an operating system,
- We will introduce how operating systems are installed, customized and how they boot?

Covered by ch. 1, ch. 2
& Parts of ch. 3 & ch. 13
in the text book.



The End!!

Thank you

Any Questions?