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CS 630-003, 005, 853: Operating System Design

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CS 630: Fall: Operating Systems Design

Instructor: **Dr. Lay**
Email: lay@njit.edu
Phone: 973 596 2654
Office Hours: Check Canvas after the semester begins.
Office: GITC 4401 (online meeting preferred. In person meeting only with appointments.)

Course Content: *Organization of operating systems covering structure, process management and scheduling; interaction of concurrent processes; interrupts; I/O, device handling; memory and virtual memory management.*

This course does not talk about how to use WINDOWS and its associated applications.
This course will talk about how an operating system is programmed, and how a modern OS will facilitate an application program.
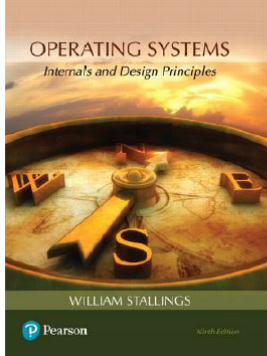*You should NOT take this course*
1. *If you are not interested in writing computer programs using any coding language*
2. *If you do not want to read any programming code*

Students are expected to know all the fundamentals of computer programming.
And this course is NOT designed for students who are only interested in business management.

- **The NJIT Honor Code will be upheld, and that any violations will be brought to the immediate attention of the Dean of Students.**
- **Each student has the responsibility to monitor https://canvas.njit.edu/ for updates and assignments!**

Required Materials:

Text: **Operating Systems: Internals and Design Principles (9th Edition)**
- **Publisher:** Prentice Hall;
- **ISBN-10:** 013-380591-3
- **ISBN-13:** 9780-380591-8

Attendance & Class Participation:
This is one of the core courses for CS program. Students are strongly encouraged to attend every class. Class participation is highly encouraged.

Ethics and Integrity:
Each student is expected to write her/his own assignments. Students may work in groups to discuss the issues, but when it comes time to write, students MUST submit their own work product.
The requirements of group assignments will be defined differently, but still each student needs to submit individual reports that describes the contribution.

Cell Phone Policy
1. Turn cell phone to silent mode or vibration mode during the class.
2. Turn off the cell phone during quizzes and exams.

Grading:

The final grade will be calculated based upon the following points:

Graded Tasks	Points	Grading Guidelines
Homework	10%	
Programming Project	10%	
Quizzes	10%	
Midterm Exam	25%	
Final Exam	35%	
Class Participation / Discussion	10%	

Total: 100%

How you can earn the credits of Class Participation (4%)
● Class Participation is highly encouraged. If you answer questions in the classroom, you should record it and send your document to me right before the final exam. I don't have a fixed format for the class participation report besides it has to be an excel file, but you should make it easy to understand: not too brief (like I answered 5 questions on 09/15/2024), filled with meaning information (like what questions did I answer?) but not too lengthy, and well organized. I look forward to reading your participation report!

Discussions (6%)
You are also expected to participate in weekly discussion forums in Canvas. When all students participate in a healthy discussion, it creates an active learning environment that will help you better understand the materials and be more successful in the class. You are free to post information about any external material that seems relevant to the specific topics (for example, links to any YouTube videos or any other informative articles pertaining to the topic and so on.) so that everyone could benefit. You will post your initial response to the prompt by Fridays at 11:59pm and respond to two classmates by the deadline of the assignment.

Programming Project
● Group Project: Students will make their groups within 3 weeks of the start of class and those students who fail to form a group for them groups will be randomly generated.
● Two stages: In the first stage, the students will be asked to prepare project ideas and the ideas will be presented to the TA so it can be approved or declined by me. The project ideas ma. be declined, and new ideas will be assigned.

Quizzes
● Paper quizzes will be randomly given anytime during the class.
● All quizzes will be given in class
● It may come with different forms: MC questions, fill in the blanks, explanation of keywords, random summary of lecture materials
● No makeup of any quiz will be offered

Homework
● Open ended questions or numerical questions will be offered as homework assignments for some chapters.

Late Submission Policy
A zero point will be given when the deadline approaches. The reason for late assignments has to be approved by the Office of the Dean of the Students. Only one late submission for each Assignment category will be considered, and 10% reduction will be implemented. Notice that there is no "late submission" for quizzes or exams, nor "Class Participation".

Midterm exam and Final Exam

● In class and paper-based exams
● Questions: 50% MCQ + 50% Problems

Other Activities/Instructions
1. Groups will be same for homework presentation and programming project
2. Students will do a self-introduction within the first week of class on the Discussion area of Canvas. This is part of the Participation credits.

Grading Policies
A 85% and above
B 70% and above (B+ 78% and above)
C 55% and above (C+ 63% and above)
F otherwise

Teaching philosophy:
The lecture is to add values to the textbook, not just repeating. I will try to:
1. Enhance the concepts already covered in the textbook and PPT slides by adding new materials
2. Point out key concepts

It will be your responsibility to read the textbook and go over all the slides I post in Canvas.

All prepared materials (other than textbook) and communications are posted on Canvas.njit.edu. You should visit the web site often.

How to ask questions:
Please ask all your questions in Piazza or **"Inbox"** of Canvas. Questions via email may not be answered at all!

Extra credit: Often some students approached me for extra credit, when they had not done well in the exams. Here I want to set a rule: the extra credits may only be considered for students who have earned participation grades higher than 60%.

P.S. The schedule is subject to change without prior notice.

Week	Date	Content
1	2-Sep	Chapter 1: Computer System Overview
2	9-Sep	Chapter 2: Operating System Overview
3	16-Sep	Chapter 3: Process Description and Control
4	23-Sep	CH3 continued
5	30-Sep	Chapter 4: Threads
6	7-Oct	**CH5 Concurrency**
7	14-Oct	Midterm Exam (online)
8	21-Oct	Chapter 6: Concurrency: Deadlock and Starvation
9	28-Oct	Chapter 7: Memory Management
10	4-Nov	Chapter 8: Virtual Memory
11	11-Nov	Chapter 9: Uniprocessor Scheduling
12	18-Nov	Thanksgiving break
13	25-Nov	Chapter 10: Multiprocessor and Real-Time Scheduling
14	2-Dec	Reserved for Make-up
15	9-Dec	Reading Date
16	16-Dec	**Final Exam (check NJIT Registrar's office)**

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Project: To be determined.