**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.*

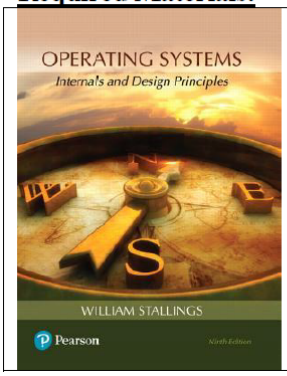
*This course does not talk about how to use WINDOWS and its associated applications.*
*This course will talk about how an operating system is programmed, and how a modern OS will facilitate an application program.*
*You should NOT take this course*

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.*

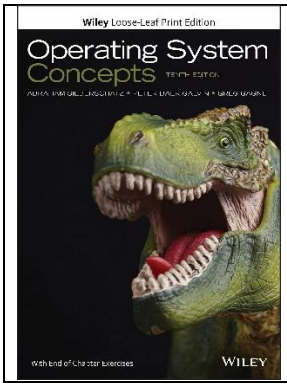
- **The NJIT Honor Code will be upheld, and that any violations will be brought to the immediate attention of the Dean of Students.**
- **Each student has the responsibility to monitor https://canvas.njit.edu/ for updates and assignments!**

**Required Materials:**




Text: **Operating Systems: Internals and Design Principles (9th Edition)**

- **Publisher:** Prentice Hall;
- **ISBN-10:** 013-380591-3
- **ISBN-13:** 9780-380591-8




**Operating System Concepts 10th Edition**

- **Publisher :** Wiley; 10th edition (February 9, 2021)
- **ISBN-10 :** 1119800366
- **ISBN-13 :** 978-1119800361

**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 | 30% | |
| Class Participation | 10% | |
| Attendance | 5% | |
| | | Total: 100% |

**How you can earn the credits of Class Participation (10%)**
● Before lecture: Review the contents of last class: limited to 3 students, 3 minutes each, first come first served.
● Answer Instructor's questions in class:

1. Raise your hands and TA will give you permission to answer. Answering without permission won't be awarded points.
2. 1 point for each answer, maximum three answers per question will be recorded.
3. Each student can earn 7 points max in each class.
4. If you cannot get a chance to answer questions, you should volunteer for review.

● Activities in Piazza will be evaluated and awarded points to the Participation credit, if the contents are relevant.
● Participate in the Discussion area of Canvas promptly when a topic is posted by the Instructor
● Report participation grade will be posted 3 times in a semester. You should check your participation credits promptly.

**Pop quizzes and Paper quizzes (10%)**
● All pop quizzes will be via Lockdown browser
● It may come with different forms: MC questions, fill in the blanks, explanation of keywords, random summary of lecture materials
● Students could choose to answer questions using a laptop PC, **students should always bring a laptop PC** to the classroom. If you don't have one, you can always borrow it from NJIT library before the classes.
● Paper quizzes will be randomly given anytime during the class.
● No makeup of any quiz will be offered

**Homework (10%)**
● This is group assignments, there are 2 research projects: 5% each,
● Group presentation: Students will make their groups within 2 weeks of the start of class and those students who fail to form a group for them groups will be randomly generated.

● One research project should be presented in person and one research presentation should be video recorded
● There will be 3 to 4 people in one group

**Programming Project (10%)**
● Group Project: Students will make their groups within 2 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 may be declined, and new ideas will be assigned.

**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: 40% MCQ + 60% 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 65% and above (B+ 75% and above)**
**C 45% and above (C+ 55% and above)**
**F otherwise**

Extra credit: Often some students approached me for extra credit, or extra assignments when they have not done well in the exams. Here I want to set a rule: the extra credit, or extra assignments will only be considered for students who have high participation score.

**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!

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

| Week | Date | **Content** |
|---|---|---|
| 1 | 5-Sep | Chapter 1: Computer System Overview |
| 2 | 12-Sep | Chapter 2: Operating System Overview |
| 3 | 19-Sep | Chapter 3: Process Description and Control |
| 4 | 26-Sep | CH3 continued |
| 5 | 3-Oct | Chapter 4: Threads |
| 6 | 10-Oct | Chapter 7: Memory Management |
| 7 | 17-Oct | Midterm Exam |
| 8 | 24-Oct | Chapter 8: Virtual Memory |
| 9 | 31-Oct | CH8 Continued |
| 10 | 7-Nov | Chapter 5: Concurrency: Mutual Exclusion and Synchronization |
| 11 | 14-Nov | Chapter 5: Concurrency: Mutual Exclusion and Synchronization |
| 12 | 21-Nov | Chapter 6: Concurrency: Deadlock and Starvation |
| 13 | 28-Nov | Chapter 9: Uniprocessor Scheduling |
| 14 | 5-Dec | Chapter 10: Multiprocessor and Real-Time Scheduling |
| 15 | 12-Dec | Reading Date: 12/15 |
| | | **Final Exam (check NJIT Registrar's office)** |