CMP 426 (section ZF81) CMP 697 (section ZF81): Operating Systems
Mathematics and Computer Science
Lehman College, City University of New York
Spring 2017

Instructor:Professor *Gwang Jung*
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Lecture Schedule: Mondays and Wednesdays: 6:00 PM - 7:40 PM (GI 333)
Office Hours: Mondays and Wednesdays: 3:00 - 5:30 PM; and other time by appointment

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Course Objectives:
A study of the functions and implementation of operating systems for various sizes and types of computers.

- Topics include introduction to computer systems, process and thread concepts, threads/process coordination, memory management, file/storage management, distributed operating system issues, protection and security issues.

Textbook:

- **A. Silberschatz, P. Galvin, and G. Gagne, *Operating System Concepts*, 9 th Edition, John Wiley & Sons, 2013. ISBN 978-1-118-06333-0**

References:

- Lecture Notes and Course Web Site

Evaluation:

- 3 Exams (90 minutes each) including mid and final exams: 80%
- Homework Assignments (3 Written or Programming): 15%
  - process creations/executions based on Linux/UNIX API and Win API
  - message based communications based on Linux/UNIX API
  - shared memory based communications between processes based on Linux/UNIX API and WIN API
  - multithreading based on POSIX API, Win API, Java threads
  - Java nexus IO (memory mapped IO), Windows memory mapped IO
  - synchronization based on UNIX System V API, POSIX API, Win API
  - Linux kernel module programming/driver programming
- Class participation (10%)

Homework

- Several homework assignments are given during lectures. Students need to work on the homework for preparing exams, but may not need to submit the homework assignments to the instructor. Some selected homework problems will be assigned as formal assignments to be submitted.

- For Graduate Students Only (CMP 697): Research Paper (as a part of assignment) (10-12 pages double space in 12 fonts) in various contemporary research areas such as: threading issues in Linux kernels, fast mutual exclusions, virtualization and cloud computing, file systems in solid state devices, in-memory file systems, in memory DBMS; some details about research paper

writing and presentation will be discussed during office hours. Research Paper Proposal Due: February 27, 2017 (2-3 pages of extended abstract with at least 5 academic research papers as references)

Exam Schedule:

- TBA

Makeup exam might be given only when a student's absence is unavoidable. In such a case, the student must file formal written request.

Course Outline:

Overview (Chapters 1 and 2)

1) An Overview of Operating Systems
2) Computer System and OS Structures

Process management (Chapters 3 to 7)

1) Process Concept
2) Threads
3) Process & Threads Synchronization
4) CPU Scheduling
5) Deadlocks

Memory and Storage Management (Chapters 8 to 13)

1) Memory Management
2) Virtual Memory
3) File System Interface
4) File System Implementation
4) IO Systems

Distributed Systems (Chapter 17)

1) Distributed System Structures
2) Distributed File Systems
3) Distributed Coordination

* Protection & Security (Chapters 14 and 15)