CSCE-4600/5640 Operating Systems Design

Fall 2012

Meeting Time: Mon/Wed 3:30 - 4:50 pm
Classroom: NTDP B140

Instructor: Song Fu
Office: NTDP F250
Office Hours: Tuesday 9:30 – 11:30am, or by appointment
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Teaching Assistant: Yiheng Liang
TA Office Hours: TBA

Textbook: *Operating System Concepts* (8th Edition), by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne, Wiley, 2008, ISBN-13: 978-0470128725.

Course Web Page: http://www.cse.unt.edu/~song/csce4600-5640/
Prerequisites: CSCE 3600: System Programming or equivalent

Operating Systems Design

After a brief overview of the different issues we will encounter during this course, we will review the principles of Operating Systems in detail. This course will focus specifically on the management of processes and their coordination, deadlocks, memory management, process scheduling, and security. Time permitting, we will discuss some of the important issues in the area of distributed systems. While the course will loosely follow the textbook, however, we will study material from many other sources, e.g., journals. The course will strike a balance between the programmers (applied) perspective and a theoretical view of operating systems.

Course outcomes:

Students will be able to:

1. use the principles of processes and threads for abstraction of real-world events
2. formulate solutions for mutual exclusion and process synchronization
3. understand the concept of deadlock to develop deadlock free systems of processes
4. understand principles of memory and resource management
5. identify different process scheduling paradigms and utilize them in system development
6. develop fundamental security features to protect systems and data

Useful References:

1. *Advanced Concepts in Operating Systems* by M. Singhal and N. G. Shivaratri
2. *Operating Systems – Advanced Concepts* by M. Maekawa, A. Oldehoeft and R. Oldehoeft

3. *Operating Systems* by J. Bacon and T. Harris
4. *Operating Systems* by W. Stallings
5. *Advanced Programming in the UNIX Environment* by W.R. Stevens
6. *Beginning Linux Programming* by R. Stones and N. Matthew
7. Online references will be posted on the course website.

Tentative List of Topics:

Topic	**Reading**
Introduction to OS	Chapters 1 and 2 in Textbook
Processes and Threads	Chapters 3 and 4
Process Synchronization and Coordination	Chapter 6
Classic Process Coordination Problems	Chapter 6 and Handouts
Process Scheduling	Chapter 5
Deadlocks, Avoidance and Prevention	Chapter 7, Handouts, References
Memory Management	Chapter 8
Virtual Memory and File Systems	Chapters 9, 10, and 12
Protection and Security	Chapters 14 and 15, Handouts
Distributed Systems	Handouts and References

Homework:

There will be about 4-5 homework assignments. Homework assignments are to be completed **individually** unless specified otherwise. Homework will consist of problem sets as well as small programming assignments. It is important to spend the time to experiment with the various program elements, so start your homework promptly. All assignment submissions must be typed.

Projects:

There will be two course projects for which you will be expected to work in small groups. The maximum group size will depend on the type of project and will be specified at a later time. Each project must be accompanied by a detailed project report describing the problem, the implementation, experiments and results as well as their interpretation.

Reading Assignments:

In addition to regular homework, there is a standing reading assignment of all chapters listed in the table above. Material covered in each of the textbook chapters assigned may form the basis for questions in homework, projects, and exams.

Exams:

There will be two exams: midterm and final exams, each covering separate parts of the course material.

Grading:

Item	% of final grade
Class Participation	5%
Homework & Quizzes	20%
Midterm Exam	25%
Final Exam	25%
Projects	25%

Policies:

- All homework assignments and projects must be turned in at the beginning of class on their respective due date. Late assignments will be accepted with a 25% penalty per day. Assignments that are submitted more than three days past their deadline will not be accepted and not graded. All assignment submissions must be typed.
- Cheating will not be tolerated. Anyone found guilty of cheating on a test or assignment will be awarded an F grade for the course. Discussions of problems and assignment with your classmates is welcome and encouraged, however, sharing of solutions is not. If you need help, you should ask the instructor. Cheating includes, but is not limited to, all forms of plagiarism and misrepresentation.
- There will be NO "make-up" Exams. In case of verifiable emergencies, arrangements must be made with the instructor.
- There will be NO early midterm or final exams.

Disability Policy:

The Computer Science Department and this instructor cooperate with the Office of Disability Accommodation to make reasonable accommodations for qualified students (cf. Americans with Disabilities Act and Section 504, Rehabilitation Act) with disabilities. If you have not registered with ODA, we encourage you to do so. If you have a disability for which you will require accommodation please discuss with me after class and present a written accommodation request on or before the 2nd week of class.