CSCE-4600 Operating Systems Design

Spring 2016

Meeting Time: TTH 10:00 am - 11:20 pm

Classroom: NTDP B190

Instructors: David M. Keathly
Office: NTDP F202
Office Hours TTh 12:00 – 1:00 pm, Wed 11:00 am – 3:00 pm
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Teaching Assistant: Dillon Stout (dillionstout@my.unt.edu)
TA Office Hours: TBA
Textbook: "Operating System Concepts - Essentials" 2nd Edition (but edition 1 can be used if you have a copy) by Silberschatz, Galvin, and Gagne
Course Web Page: UNT Blackboard (learn.unt.edu)
Expected background: Systems Programming (or equiv.)

Operating Systems

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 and other textbooks. The course will strike a balance between the programmers (applied) perspective and a theoretical view of operating systems.

CSCE 4600 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 Maekawa, Oldehoeft, and 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

Tentative Schedule of Topics:

Week of:	Topic:	Reading Assignments:
1-19	Introduction to OS – an overview	Chapter 1 & 2 in Textbook
1-26	Introduction to OS continued:	
2-2	Operating System Structures and Introduction to Processes	
2-9	Processes & Threads – basic concepts	Chapter 3 & 4 in Textbook
2-16	Process Scheduling – Conventional and Real-Time	Chapter 6 in Textbook
2-23	Real-Time Scheduling, Intro to Process Synchronization	Chapter 5
3-2	Process Synchronization and Coordination	Chapter 5 and Handouts
3-9	Higher-Level Synchronization Mechanisms	
3-16	SPRING BREAK	
3-23	Classic Process Coordination Problems	
3-30	Intro to Deadlocks	Chapter 7, Handouts, References
4-6	Deadlock Avoidance and Prevention	
4-13	Main Memory Management	Chapter 8
4-20	Virtual Memory and File Systems	Chapter 9, 10, 12
4-27	Protection and Security	Chapters 14 and 15, Handouts
5-4	Distributed Systems (time permitting)	
5-11	Final Exam Week: Exam according to UNT Exam Schedule	

Homework:
There will be regular homework assignments for each topic covered. Homework assignments are to be completed **individually** (see policies) 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. **Handwritten assignments WILL NOT be graded.**

Projects:
There will be several 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.

Testing:
There will be three tests, each covering separate parts of the course material.

Grading:

Item	**% of final grade**
Homework	35%
Projects (2-3)	35%
Tests (3)	30%

Course Policies:

- **Attendance:** Students are expected to attend all lectures. There are aspects of the material that are being discussed in class, which are not found in the textbook or the slides. Further, in-class discussions are an important part of the course and students should actively participate.

- **All homework assignments and projects** must be turned in at times specified and in the dropbox provided in BB Learn. Late assignments will be accepted with a 25% penalty per day. Assignments that are submitted more than two days past their deadline will not be accepted and not graded. All assignment submissions must be typed.

- **Cheating and Plagiarism** will not be tolerated. Anyone found guilty of cheating on a test or assignment will receive zero points for the entire unit of work and will result in a lowering of the 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 TA or the instructor. Cheating includes, but is not limited to, all forms of plagiarism and misrepresentation. Multiple occurrences of cheating will result in a failing grade for the course and reporting of all students involved to the appropriate college and university level offices for academic conduct. In extreme cases the instructor will recommend that the student be expelled from the university.

- **There will be NO "make-up" Tests**. In case of verifiable emergencies, arrangements must be made with the instructor.

- **There will be NO early Tests or Exams**.

Student Evaluation of Teaching Effectiveness (SETE)

The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider the SETE to be an important part of your participation in this class

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 before the 2nd week of class.

Please provide the following information and submit this page at the end of the first class.

First Name: _____

Last Name: _____

E-MAIL : _____

I have read and understood the above course policies!

Initial: _____