EE 5370 --- Operating Systems

Spring 2017

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Text: Operating System Concepts (8th Edition)
by Abraham Silberschatz, Peter Galvin, and Greg Gagne

Course Description: Review of fundamental operating system design concepts. Distributed operating system concepts. An independent study on cloud computing where students read the research literature and write a survey/tutorial article on cloud computing.

Prerequisite: EE 4374 Operating Systems Design or its equivalent (C or better)

Class Hours: Tuesdays and Thursdays 3PM to 4:20PM, UGLC Room 340

Office Hours: Tuesdays and Thursdays 1:30PM to 3PM, ENG A-340

Course Outline:

Weeks 1-2:	Introduction to Operating Systems (Chaps. 1 and 2)
Weeks 3-4:	Introduction to Processes/Threads and Scheduling (Chaps. 3, 4, and 5)
Weeks 5-6:	Process Synchronization (Critical Section Problem) (Chap. 6)
Week 7:	Deadlocks: Characterization and Prevention (Chap. 7)
Week 7:	**Midterm Exam**
Weeks 8-9:	Memory Management (Chaps. 8 and 9)
Weeks 10-11:	File Systems (Chaps. 10 and 11)
Week 12:	Introduction to Distributed Operating Systems (Chap. 16)
Weeks 13-14:	Distributed File Systems (Chap. 17)
Week 14:	Distributed Computation
Weeks 14-15:	Distributed Process Synchronization (Chap. 18)

Grading:

Assignments	30%
Survey Article	20%
Midterm	25%
Final	25%

Survey Article:
Students are expected to independently develop a significant expertise on cloud computing by studying material in the research literature and writing a *tutorial/survey article* on this topic.

Students will read and understand the following two articles:

1. L. Vaquero, L. Rodero-Merino, J. Caceres, M. Lindner, "A Break in the Clouds: Towards a Cloud Definition", *ACM SIGCOMM Computer Communication Review,* vol. 39, no. 1, pp. 50-55, January 2009.
2. M. Armbrust, A. Fox, R. Griffith, A.D. Joseph, R.H. Katz, A. Konwinski, G. Lee, D.A. Patterson, A. Rabkin, I. Stoica and M. Zaharia, "A View of Cloud Computing", *Communications of the ACM*, vol. 53, no. 4, pp. 50-58 April 2010.

In addition to the two articles above, students will find survey articles and articles describing original research results on cloud computing. Students will select eight articles in consultation with the course professor. Therefore, a total of ten articles will be read and understood by the students. Each of the eight articles must have been published in the last 10 years and come from IEEE and ACM conferences and journals. At least two of the five articles must have been published in the past five years.

Reading and comprehending these research articles will further develop student expertise on cloud computing. In addition, students will have a good sense for the cloud computing problems currently being investigated by researchers. In the tutorial/survey article students will express in tutorial style the fundamentals of cloud computing and then transition into a thorough description of some of the problems researchers are investigating.

Course Outcomes:
1. Students will understand the differences between: program, process, and thread.
2. Students will understand several techniques for process scheduling that minimize average completion time and place an upper bound on response time. Students will understand the basics of scheduling theory.
3. Students will understand the issues that arise with concurrent software and techniques for resolving these issues.
4. Students will understand process synchronization methods to resolve software concurrency issues. The process synchronization methods will include those designed for distributed systems.
5. Students will understand how to characterize a deadlock condition among multiple processes and techniques for resolving deadlocks. The deadlock resolution techniques will include those designed for distributed systems.
6. Students will understand techniques for managing the lowest level of the memory hierarchy: Virtual Memory.
7. Students will understand the design principles for both centralized and distributed file systems.
8. Students will understand how to conduct a research literature review and write a tutorial/survey article.

Academic Dishonesty:

As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self responsibility. The assumption that a student's work is a fair representation of the student's ability to perform forms the basis for departmental and institutional quality. All students within the Department are expected to observe appropriate standards of conduct. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in the whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts will not be tolerated. Any case involving academic dishonesty will be referred to the Office of the Dean of Students. The Dean will assign a Student Judicial Affairs Coordinator who will investigate the charge and alert the student as to its disposition. Consequences of academic dishonesty may be as severe as dismissal from the University. See the Office of the Dean of Students' homepage (Office of Student Life) at http://studentaffairs.utep.edu/dos for more information.

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass. *CASS' Staff are the only individuals who can validate and if need be, authorize accommodations for students with disabilities.*