

COMP755 Advanced Operating Systems

Fall Semester 2013

Instructor: Dr. Kenneth A. Williams

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office hours: MF 11:00 to 12:00, MW 4:30 to 5:30, RF 2:00 to 5:00

other times by appointment

Prerequisites: Undergraduate level knowledge of operating systems such as COMP450

Text: *Operating System Concepts with Java, 8th Edition*, by Silberschatz, Galvin and Gagne, Wiley Publishing, 2010, ISBN: 0-470-50949-X

Communication: The web page for this class is <http://williams.comp.ncat.edu/comp755>
Assignments and information will also appear on the University's online Blackboard system, <http://blackboard.ncat.edu> Email messages will be sent to the student's A&T email address. It is the student's responsibility to regularly check their A&T email account.

Description: 3 credits

This course centers on operating systems for multi-processing environments: concurrent processes, mutual exclusion, job scheduling, memory, storage hierarchy, file systems, security, and distributed processing. Also discussed are virtual resource management strategies. A design project involving the construction of operating facilities is produced. Some of the topics to be covered include:

- Secure boot
- Deadlock
- Concurrent Programming
- Queuing theory
- Virtual machines
- Virtual memory
- System Performance
- Security
- File systems

Goals: Upon completion of this course, the student should be able to:

- Understand how a modern operating system accomplishes its magic
- Write concurrent programs using multiple threads or processes
- Design a concurrent system that will be free of deadlock
- Explain the important algorithms in operating system design
- Describe the tradeoffs involved in operating system design choices
- Be aware of some emerging research areas in operating systems

Response clickers: This course may use response clickers during the lecture. Response clickers will be loaned to the students for the semester. Each student should have their own response clicker and should bring it to every lecture. The response clickers will be used to provide input during the lectures.

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Grading: A student's grade in the class will be based on their performance on the exams, quizzes, programs and homework assignments. All work will be graded on a numerical scale from 0 to 100. The final grade will be the weighted sum of all work using the following weights:

assignments and programs	15 % combined
research paper	5%
3 exams	20 % each
final exam	20 % Wednesday, Dec. 11, 10:30am – 12:30pm

The lowest homework or quiz grade will be discarded. Homework must be turned in at the beginning of class on the assigned day for full credit, unless accompanied by a valid excuse. Homework turned in within one day of the assigned time will be penalized 20%. Homework turned in within two days of the assigned time will be penalized 25%. **No homework will be accepted after two days. Students who are absent** during a class period when a test is given, **will receive a score of zero** unless previous arrangements are made or a valid written excuse is presented.

Final letter grades will be based on the following scale:

A: 80 to 100 B: 70 to 80 C: 60 to 70 F: less than 60

Students will be allowed one and only one 8½ by 11 inch page of notes during the exams. Both sides of the note page can contain information as small as the student desires. You are not allowed to use more than 187 square inches of paper surface to hold your notes. Any additional pages, fold outs, flaps or other means of extending the page of notes will be considered cheating.

Attendance: Students are expected to attend all lectures. The lectures introduce the class material. Some material presented in the lectures is not covered in the text. Students are responsible for all class material covered or assigned in lectures.

Cheating: Instances of cheating will be handled according to departmental policy. Cheating covers any case in which a student has received unauthorized aid in his/her performance that contributes to a course grade or submits material contributing to a course grade with the intent to deceive the instructor or grader. If the unauthorized aid includes help from another student, then that student is considered to have cheated as well. Students are expected to submit assignments that are entirely their own work. A common example of cheating is to copy another person's program or homework assignment.

If a student cheats on a homework assignment, then he/she will receive a grade of zero (a grade of F) for that item as will anyone assisting him/her in an unauthorized way. If a student cheats on an exam or the final, he/she will receive a failing grade for the class. All cases of cheating will be reported to the Director of Graduate Studies. When a student cheats for the second or more time in any Computer Science class, he/she will receive an F in the class in which the most recent case occurred and will be referred to the University authorities for disciplinary action.

Special needs: Students with any special need or disability should inform the instructor or the Office of Veterans and Disability Services at the beginning of the semester. Any necessary accommodations will be made.

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Class Schedule

	Wednesday, August 21 Introduction read chapter 1
Monday, August 26 OS structure read chapter 2	Wednesday, August 28 Concurrent Programming read sections 6.1 – 6.7
Monday, September 2 <i>Labor Day Holiday</i> <i>(no class)</i>	Wednesday, September 4 Concurrent Programming
Monday, September 9 Concurrent Programming	Wednesday, September 11 Deadlock & thread implementation read chapter 7
Monday, September 16 CPU scheduling & review read chapter 5	Wednesday, September 18 Exam 1
Monday, September 23 Queuing theory	Wednesday, September 25 Queuing theory
Monday, September 30 Performance prediction	Wednesday, October 2 Performance prediction
Monday, October 7 <i>Fall Break</i> <i>(no class)</i>	Wednesday, October 9 Memory management Chapter 8
Monday, October 14 Virtual memory Chapter 8	Wednesday, October 16 Virtual machines
Monday, October 21 Exam 2	Wednesday, October 23 File systems Chapter 10
Monday, October 28 File Systems Chapter 11	Wednesday, October 30 Small systems
Monday, November 4 Concurrent programming review	Wednesday, November 6 Virtual machines
Monday, November 11 Secure boot	Wednesday, November 13 Concurrent Programming Exam
Monday, November 18 Distributed Systems Chapter 16 & 17	Wednesday, November 20 Security Chapter 14
Monday, November 25 Security Chapter 15	Wednesday, November 27 <i>Thanksgiving Holiday</i> <i>(no class)</i>
Monday, December 2 Exam 3	Wednesday, December 4 Review
	Wednesday, December 11 10:30 – 12:30 Final Exam