

ITK 383 – Section 001 and 002
Principles of Operating Systems
Spring 2008

Instructor: Kyoungwon (Ben) Suh

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Office Hours: Monday/Tuesday 2:00PM to 4:00PM or by appointment

Course Web page: We will use my personal web site for ITK 383 (<http://www.itk.ilstu.edu/faculty/kwsuh/courses/itk383spring08>) tentatively. In a few weeks, the course web site will be migrated to <http://blackboard.ilstu.edu>

Prerequisites: ITK 169 and ITK 254

Section 1
Time: MW 9:35-10:50 AM
Location: Stevenson Hall 105
Section 2
Time: MW 11:00AM-12:15 PM
Location: Stevenson Hall 105

Course Description

The course reviews classical functional criteria for operating system design and introduces the fundamental paradigms of distributed operating systems. Topics includes: process allocation, processor scheduling, resource management, virtual memory, file system, I/O devices, multiprocessors, and distributed systems. Security and protection will be covered. The course also includes case studies for a practical approach.

Course Objectives

Students will learn the basic concepts of modern operating systems design, common to most computer systems. The successful students will learn the issues involved in building computer operating systems

(including multiprocessor and distributed operating systems), and interaction among the various components.

Textbooks and Class Materials

Required Textbooks

Andrew S. Tanenbaum. *Modern Operating Systems*. 3rd Edition. Prentice Hall, 2007, ISBN 0-13-601919-6 (or 978-0-13-601919-0).

Materials

The instructor may assign additional readings.

Course Requirements

Exams:

There will be two in-class mid-term examinations in addition to the final, which will be comprehensive. If you are unable to attend an exam due to illness or another valid reason, you must notify your instructor **prior to** the exam to make arrangements for making up the exam. If you are unable to reach your instructor personally, email your instructor or leave a message either in the ITK department office (Old Union 202) or on your instructor's voice mail. **No makeup examination will be administered without the instructor's notification and validation of the excuse before the exam date.** You should make arrangements **now** to attend the exams.

- Exam 1: first 1/3 of course
- Exam 2: second 1/3 of course
- Final exam: 50% on final 1/3 of course and 50% over first 2/3s of course

Homework: There will be 6 to 8 homeworks.

Programming projects: 2 to 3 programming projects in Java and/or C/C++.

Programs containing compilation errors will receive failing grades. Those containing run-time errors will incur a substantial penalty. You should make a serious effort to complete all programs on time. Programs may be turned in up to three days late for a 10% penalty per day (M-S). After that, they will not be accepted.

Programming assignments are individual unless specified otherwise. You should complete them with your own effort. If you need help, you should come to my office hours. You may discuss concepts with others in the class, but not assignment specifics.

Other

You are expected to attend class regularly, read the assigned reading before class, and participate in class discussions. Borderline grades (within 1% range) will take into consideration of attendance and participation in class, effort shown in completing class assignments, and results from subsequent exams.

There will be several pop quizzes in the class covering topics previously covered in lecture or in your readings.

Plagiarism and other forms of cheating

- Knowingly turning in work that you did not do is plagiarism, the most common form of cheating. It is unacceptable in this course and a foolish way to try to get through the course.
- Do not work with anyone else on programs and other assignments unless you have been told that it is acceptable by your instructor for the specific assignment.
- Do not work together on individual programming assignments.
- Do not discuss specifics of individual assignments, including programming assignments, with people other than your instructor.
- Do not use code downloaded from the web on individual programming assignments
- Do not show someone your completed program or parts of it, even if the person claims not to intend to cheat.
- Any case of cheating will result in a minimum penalty of a zero on the assignment.
- This applies to both the person who did the work and made it available and the person who copied.
- The maximum penalty will be an F in the course and pursuit of further disciplinary action.
- **All** cheating will be reported to SDRS as required by university policy (see your student handbook).

From the Illinois State University Code of Student Conduct
http://www.crr.ilstu.edu/downloads/Code_of_Student_Conduct.pdf

1. Academic Dishonesty. Including but not limited to:

Students are expected to be honest in all academic work. A student's placement of his or her name on any academic exercise shall be regarded as assurance that the work is the result of the student's own thought, effort, and study.

Students shall not:

- a. possess or utilize any means of assistance (books, notes, papers, articles, etc.) in an attempt to succeed at any quiz or examination unless specifically authorized by the instructor.
- b. take any action with intent to deceive the person in charge as to the student's acting without honesty to complete an assignment, such as falsifying data or sources, providing false information, etc. Students are prohibited from conversation or other communication in examinations except as authorized by the instructor.

c. appropriate without acknowledgement and authorization another's computer program, or the results of the program (in whole or part) for a computer-related exercise or assignment.

d. plagiarize. For the purpose of this policy, plagiarism is the unacknowledged appropriation of another's work, words, or ideas in any themes, outlines, papers, reports, speeches, or other academic work. Students must ascertain from the instructor in each course the appropriate means of documentation.

e. submit the same paper for more than one University course without the prior approval of the instructors.

f. willfully give or receive unauthorized or unacknowledged assistance on any assignment. This may include the reproduction and/or dissemination of test materials. Both parties to such collusion are considered responsible.

g. substitute for another student in any quiz or examination.

h. be involved in the advertisement, solicitation, or sale of term papers or research papers.

Disability Concerns

Any student needing to arrange a reasonable accommodation for a documented disability should contact Disability Concerns at 350 Fell Hall, 438-5853 (voice), 438-8620 (TDD).

Evaluation

Your grade will be determined based on the following distribution:

2 midterm exams:	30% (15% each)
Final exam:	30%
Programming projects	20%
Homeworks/Quizzes	20%
Total	100%

Your grade is computed as a *weighted average* based on the percentages above. It is **not** your total points divided by the total number of points possible in the course. You may end up with far more points for quizzes or homework than for programs, but your program average will count two and a half times as much as your quiz and homework average.

The grading scale for this course is:

A 90-100

B 80- 89

C 70- 79

D 60- 69

F Below 60

Lab Facilities

Homework and programming activities may be completed in Old Union 133 and any other labs in Old Union when they are not in use. You will use your ISU ID card to get into the labs.

Important Dates

Monday, January 28: Last day to withdraw without a WX

Friday, February 8: Last day to withdraw with a WX

Saturday, May 3: Last day of classes

Tuesday, May 6: Final Exam for Section 1: 7:50 AM to 9:50 AM

Monday, May 5: Final Exam for Section 2: 7:50 AM to 9:50 AM

Tentative schedule (Note: The most up-to-date version of the course schedule, syllabus, and all lecture notes, homeworks, and programming assignment will be available from the course web page)

<i>wk</i>	<i>Mon.</i>	<i>Day</i>	<i>Topic</i>	<i>Reading</i> Chapter.Section	<i>Assignment</i>
1	Jan	14	- Course Intro - OS Concept and review	1.1, 1.2 1.3.1.4.1.5	
		16	- OS concept and review (cont') - System call and OS structure - C language review	1.6,1.7 1.8	Assignment 1 given
2		21	Martin Luther King Jr. Holiday – No Class		
		23	[Processes and threads] - Processes and Threads	2.1, 2.2	
3		28	[Processes and threads] - Interprocess communication (IPC)	2.3	Assignment 1 due Assignment 2 given
		30	[Processes and threads] - Scheduling - Classical IPC problems	2.4 2.5	
4	Feb	4	[Memory management] - Address spaces - Virtual memory	3.1, 3.2 3.3	
		6	[Memory management] - Page replacement algorithms - Design issues for paging systems	3.4 3.5	Assignment 2 due Assignment 3 given
5		11	[Memory management] - Implementation issues - Segmentation	3.6 3.7	Project#1 given
		13	[File Systems] - Files - Directories - File system implementation	4.1 4.2 4.3	
6		18	[File Systems]		Assignment 3 due

<i>wk</i>	<i>Mon.</i>	<i>Day</i>	<i>Topic</i>	<i>Reading</i> Chapter.Section	<i>Assignment</i>
			- File system implementation(cont') --File system management and optimization	4.3 4.4	Assignment 4 given
	Feb	20	[File Systems] - Example file systems	4.5	
7		25	<u>First midterm</u>		
		27	[Input/Output] - I/O Hardware - I/O software, software layers	5.1 5.2, 5.3	Assignment 4 due Assignment 5 given
8	Mar	3	[Input/Output] - Disks - Clocks	5.4 5.5	
		5	[Input/Output] - User interfaces: keyboard, mouse, monitor - Thin clients - Power management	5.6 5.7 5.8	Project#1 due
			Spring Break (Mar 8 – 16)		Assignment 5 due Assignment 6 given
9		17	[Deadlocks] - Deadlocks - Ostrich algorithms - Deadlock detection and recovery	6.1, 6.2 6.3 6.4	Project#2 given
10		19	[Deadlocks] - Deadlock avoidance - Deadlock prevention - Other issues	6.5 6.6 6.7	
		24	[Multimedia operating systems] - Multimedia - Multimedia files - Video compression - Audio compression	7.1 7.2 7.3 7.4	Assignment 6 due Assignment 7 given
11		26	[Multimedia operating systems]		

<i>wk</i>	<i>Mon.</i>	<i>Day</i>	<i>Topic</i>	<i>Reading</i> Chapter.Section	<i>Assignment</i>
			- Multimedia process scheduling - Multimedia file system paradigms - File placement - Caching - Disk scheduling for multimedia	7.5 7.6 7.7 7.8 7.9	
		31	[Multiple processor systems] - Multiprocessors - Multicomputers	8.1 8.2	
12	Apr	2	[Multiple processor systems] - Virtualization - Distributed systems	8.3 8.4	Assignment 7 due
		7	<u>Second midterm</u>		
13	Apr	9	[Security] - Cryptography - Protection mechanisms - Authentication	9.1,9.2 9.3 9.4	Assignment 8 given
		14	[Security] - Insider attacks - Exploiting code bugs - Malware - Defenses	9.5 9.6 9.7 9.8	
		16	Case study: Linux	10 (All)	
14		21	Case study: Windows Vista	11 (All)	
		23	Case Study: Symbian	12 (All)	Assignment 8 due
15		28	[Operating System Design]	13 (All)	Project#2 due
		30	Review Project #2 Presentation		
16	May	5	<u>Section 2: Final Exam</u> (May 5: Monday 7:50AM)		
16	May	6	<u>Section 1: Final Exam</u> (May 6: Tuesday 7:50AM)		