CSc 284 **Fall 2003**
Introduction to Operating Systems

Instructor : Fikret Ercal - Office: CS 314, Phone: 341-4857
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Office Hours : 1:45-2:45 Tuesdays and 2:00-5:00 pm Wed. or by appointment
**If the instructor is late for the class, students are expected to wait ~5 minutes before they leave the classroom.
Grader : Brian Sea - Ofc: CS-208, E-mail: *sea@umr.edu* Office Hrs: (see the course website)
Textbook : Operating Systems, 4th Ed., William Stallings
An Introduction to Unix, Paul S. Wang
Objectives Learn the major attributes of an operating system, its structure, process management, synchronization, critical sections, semaphores, deadlock handling, memory management. Learn in detail the major components of Unix (processes, pipes, filters, threads, sockets, etc.) through hands-on projects

CLASS POLICIES

- Students are expected to attend all classes unless they have a reasonable excuse for being absent.
- It is assumed that you have taken a course in computer organization and an advanced course in computer programming.
- Students are expected to know C Language reasonably well. If needed, you may get help at: http://www.strath.ac.uk/IT/Docs/Ccourse/ and http://www.cs.cf.ac.uk/Dave/C/
- **Class Notes, course syllabus, homework assignments, projects**, announcements, and other related materials can be accessed on the WWW at the address:
  http://web.umr.edu/~ercal/284/284.html
  Make sure that you regularly check this address for announcements and course related materials.
- **Class will be taught using power point slides. Before each class, students are expected to obtain a hardcopy of the slides which will be made available on the website.**
- **Projects and homeworks must be an individual effort unless stated otherwise. Cheating will not be tolerated.**
- The instructor may drop a student from this class if one of the following things happen:
  - The student has less than 60% attendance
  - The student has not turned in 50% of the assignments.
  - Midterm grade is less than 30% of the total.
- **Late assignments:** Unless there is a reasonable excuse, late homeworks and assignments will be penalized as follows: 1-3 days late $\Rightarrow$ 25% off, 4-7 days $\Rightarrow$ 50% off. More than 7 days $\Rightarrow$ 80% off.

GRADING:

Midterm (250 points); Final (250 points)
Programming Assignments: 1-9 (50 points each), Attendance quizes (50 points).

Letter grades will be assigned as follows:
A (900-1000), B (790-899), C (660-789), D (500-659), F (0-500)

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COURSE OUTLINE
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Topics	Approximate No. of Classes
Syllabus and introductions Chapter 1: Basic structure of a processor, hardware elements, memory hierarchy, cache, etc.	2
Introduction to UNIX. Writing shell scripts, process handling, I/O Redirection, Wang 1, 5, 6, 7, Appendix 5	1
Chapter 2: Evolution of operating systems, history, processes, context switch, modern UNIX systems	1
Processes in UNIX. Fork(), exec(). Wang 11.7-11.14	1
Chapter 3: process states, process control and management	2
Interrupts and Signals in UNIX: signal(), kill(). Wang 11.15	1
Chapter 4: Threads, SMP, and Microkernels	1
Solaris Thread Library Essentials: sample programs thr_create(), thr flags, thr_join(), thr_kill, etc.	1
Chapter 5: Concurrency, mutual exclusion, synchronization, semaphores, monitors, message passing, producer/consumer, and readers/writers problems, cond_signal(), cond_wait, mutex, mutex_lock, mutex_trylock, mutex_unlock, etc.	3
MIDTERM and solutions	2
UNIX pipes: Wang 12.1 - 12.4	1
Interprocess Communication using Sockets, TCP/IP, Project 8, Wang 12.5-12.11	2
Chapter 6: Deadlock and starvation, algorithms to detect and avoid deadlock, dining philosophers	2
Chapters 7,8: Memory Management, paging and segmentation, virtual memory, principle of locality, page tables, TLB, replacement policies, UNIX/LINUX mem.management	2
VIDEO: Triumph of the Nerds (or Pirates of Silicon Valley)	2
Chapters 9, 10: Uniprocessor/Multiprocessor/Real-Time Scheduling	2
Chapters 11, 12: I/O management, disk scheduling, file management, UNIX file management, I-nodes, etc.	2
FINAL	1