

## Course Information

### Course overview

CS 414 covers design and engineering issues associated with operating systems and other software that manages computers. We will cover basic and important OS concepts, including structure, concurrency, synchronization, memory, file systems, I/O and security, with more advanced topics interspersed as time permits. Our focus will be on techniques and abstractions with broad applicability, although we will also refer to case studies where appropriate. The goal of this course is to expose students to principles of good system design and to help students gain experience with systems development.

This outline and other course information can be found on the course website:

<http://www.cs.cornell.edu/Courses/cs414/2003SU>

### Instructors

Rimon Barr  
5152 Upson Hall  
barr@cs.cornell.edu

Ben Atkin  
5138 Upson Hall  
batkin@cs.cornell.edu

### Time

Monday-Friday, 10:00-11:15 AM, Holister 401, 21 May – 2 July.

*Office hours:* TBA

### Prerequisites

The course is open to any student who has mastered the material in CS314 (Computer Architecture) and has had some exposure to data structures and programming languages (e.g., C, C++, Java or Pascal), which can be obtained through CS211, CS212, or CS312. If you have questions concerning your preparedness, please consult the instructor.

### Course Material and Text

Primary text

- Silberschatz, Galvin, and Gagne, Operating System Concepts, 6th edition. John Wiley and Sons, 2002. ISBN 0471417432. Copies are on reserve in the Engineering Library, but we recommend you buy your own copy as well.

Useful references

- Tanenbaum, Operating Systems: Design and Implementation. 2nd edition. Prentice Hall, 1997. ISBN 0136386776. On reserve in the library.
- Kernighan and Ritchie, The C Programming Language, 2nd edition. Prentice Hall, 1988. ISBN 0131103628. On reserve in the library.

## Course Content

*Readings:* You will have a considerable amount of reading to do in this course. You are expected to read the relevant material *before* you come to class – this ensures lively class discussion of concepts. The surest way of getting the most out of the course is to keep up with the assigned readings. The course contents will roughly follow the textbook outline.

*Written Homeworks:* One per week. Due every Friday. [20%]

*Programming:* Three programming assignments. We will use a subset of the Minithreads project used in the regular CS414 course. You will be expected to do the programming assignments in groups of 2-3. Due on Mondays. [30%]

*Exams:* Midterm [20%, June 12] and Final [30%, July 3]. Closed Book.

## High-level outline of topics

- Introduction, and a revision of relevant 314 material. [2 classes]
- Process management [3 weeks]
  - Processes and threads
  - Scheduling
  - Interprocess Communication
  - Process synchronization, deadlocks
- Memory Management [1 week]
  - Swapping, allocation, segmentation
  - Virtual memory
- File systems [1 week]
  - File system interface
  - Implementation issues
- Miscellaneous topics [1 week]
  - Protection and security
  - Disks and disk scheduling
  - Networking
  - Distributed file systems
  - Protocols for distributed coordination