Instructor

Craig E. Wills, FL-234, cew@cs.wpi.edu. Office hours: 1:00–3:00pm Mondays, 9:00–10:00am Thursdays, any time for short questions. Electronic mail is always an effective method to contact me.

Assistants

- TAs: Salah Ahmed (sahmed2@wpi), Office hours: TBA; Ahmad Moghimi (amoghimi@wpi), Office hours: TBA
- SA: Josh Hebert (jahebert@wpi), Office hours: TBA
- faculty + assistants: cs3013-staff@cs.

Course Web Page and Official Communication

Copies of all handouts, assignments, notes and old exams will be posted as appropriate on the course Web page. Most material on this site is password protected. The address for it is http://www.cs.wpi.edu/~cs3013/a16/.

Class discussion, class hand-outs, email messages to the student’s WPI email account, and the course Web pages are avenues for official course communication. We may also be using Piazza (http://www.piazza.com/) for class discussion with more details forthcoming if the case. Students are responsible for information distributed through any of these venues.

Purpose

This is an introductory course in the design of operating systems. It covers principles, design decisions, design techniques, policies, and mechanisms. The course focuses on the design of general-purpose multiprogramming systems and covers processes, resource allocation, concurrency, memory management, time management, device control, synchronization and mutual exclusion.

The course objectives are 1) to help students gain knowledge about the components of a structured operating system, 2) for students to learn the fundamental principles and abstractions underlying design choices, tradeoffs, and their consequences, 3) to give students opportunities to apply course material with “hands on” projects, and 4) for students to develop specific skills for working in the Linux environment.
Prerequisites

Working knowledge of common data structures such as stacks, queues, and linked lists. Knowledge of high-level programming language such as C/C++. An interest in learning about operating systems.

Recommended background: CS2303 or CS 2301, and CS2011.

Text Books

Required:


Reference:


Grading Policy

Final grades will be computed as follows:
Midterm Exam: 30%;
Final Exam: 30%;
Homework, projects, quizzes, and class participation and professionalism: 40%.

Grading policy for each project and homework will be provided at the time of the assignment. In general, each assignment will have a basic objective for the majority of the assignment points and an extended objective for demonstrating additional work and understanding.

Final grades will reflect the extent to which you have demonstrated understanding of the material, and completed the assigned projects. The base level grade will be a “B” which indicates that the basic objectives on assignments and exams have been met. A grade of “A” will indicate significant achievement beyond the basic objectives and a grade of “C” will indicate not all basic objectives were met, but work was satisfactory for credit. No incomplete grades will be assigned unless there exist exceptional, extenuating circumstances.

- Programming Assignments

There will be 3-4 programming assignments. Assignments will involve programming in C/C++ on the CCC Linux machines or a Ubuntu Linux virtual machine. There will likely be a combination of individual and group projects.

Students are assumed to be competent in a high-level programming language such as C or C++. System calls and other aspects of Linux will be introduced as the course progresses and programming projects are assigned.
• Exams and Quizzes

There will be two in-class exams (including a final exam during the last week), plus the possibility of pop quizzes for which no advance notice will be provided. Exams will be closed book, closed notes. The majority of each exam will cover basic ideas and objectives of the class with a few questions testing additional understanding and insight.

• Written Homeworks

There is a possibility of written homework assignments. Written assignments consist of problems from the book, made up problems, or readings from literature.

Course Participation and Professionalism

During lectures, students are to be focused on the course. Students should not use materials or electronic devices that would inhibit their attention to the course lecture and discussion. Laptops may only be used for note-taking purposes; transmission capabilities on these devices must be disabled and only appropriate note-taking application may be used in class. Mobile devices, such as phones or PDAs, are not to be used in class. Penalties may be assessed for repeated infractions.

Students must treat each other and the teaching staff with respect at all times. Disagreement, debates, and criticism of ideas are healthy aspects of academic environments; however, students should avoid demeaning language or comments which can be taken personally. The ability to handle conflict professionally and work with a variety of people is an acquired skill, yet is increasingly important in technical careers.

Late Policy

Each homework and programming assignment will be given a point value when it is handed out. The point value indicates the weight of the assignment relative to the other assignments. Late programs and homeworks will be be penalized 5% of total assignment value per day (with the weekend counting as one day) or partial day, and no assignments will be accepted after seven days beyond the due date. All programs and written homeworks are due at the start of class on the due date. Homeworks and programs turned in after the start of class will be counted late. Projects will be submitted as directed in class. Exceptions to these rules can be made only a priori. Finally, no assignments will be accepted after the last day of class to allow sufficient time for grading.

Academic Honesty

Unless explicitly noted, all work is to be done on an individual basis. You are encouraged to talk with others about ideas and material in the course, particularly in preparing for exams. However all work, in the form of code or answers to problems, you submit for grading must be your work. Misrepresentation of the work of another as one’s own submitted work is a
violation of academic honesty. Aiding someone else to commit an act of academic dishonesty is also a violation. Submitting individually-assigned work that was jointly done with another person is a violation of academic honesty.

Any violation of the WPI's guidelines for academic honesty will result in no credit for the course and referral to the Dean of Students Office. More information on definitions, responsibilities and procedures regarding the WPI academic honesty policy can be found at http://www.wpi.edu/offices/policies/honesty/policy.html.

**Student Disability**

If you need course adaptations or accommodations because of a disability, or if you have medical information to share with the instructor, please let the instructor know. If you have not already done so, students with disabilities, who believe that they may need accommodations in this class, are encouraged to contact the Office of Disability Services (ODS), as soon as possible to ensure that such accommodations are implemented in a timely fashion. If you wish to make an appointment, please call (508)831-4908 or email DisabilityServices@wpi.edu.

**Schedule**

The following is a tentative outline of the material that will be covered in this course. All references to chapters are from Tanenbaum’s book. Not all sections will be covered from each chapter and the lectures will be supplemented with material from other sources. Each week will entail two two-hour classes (on Tuesdays and Fridays) unless otherwise noted.


**week 2:** Aug 30–Sep 2. Interprocess Communication and Coordination 2.3

**week 3:** Sep 6–Sep 9. IPC (cont.). Threads 2.2.

**week 4:** Sep 13–Sep 16. Process Scheduling 2.4. Unix IPC.

**week 5:** Sep 20–Sep 23. Midterm Exam. Memory Management 3.1, 3.2. Virtual Memory 3.3.


**week 7:** Oct 4–Oct 7. I/O Devices, Chapter 5. Additional Topics.

**week 8:** Oct 11. One class. Final Exam.