Syllabus for CS 111 – Operating System Principles
Summer 2014

The summer session is eight weeks long. There is no finals week. There will be 16 meetings of the class, plus seven recitation sections. (The 4th of July falls on a Friday this year, preempting one of the recitation sections.) The midterm exam will be held during the recitation section of the fourth week of classes. The final exam will be held during the last recitation section.

CS 111 is always a challenging class that has the reputation of being the hardest course in the UCLA CS major. Since the summer session is compressed to eight weeks, instead of ten, the pace will be faster than usual, making the class even more challenging. It is vital that you do not fall behind on your work in this class. Keep up with the readings, attend all the lectures, and get early starts on all the projects.

The textbook for the course is "Principles of Computer System Design," by Jerome H. Saltzer and M. Frans Kaashoek. Unless otherwise noted, all reading assignments are from that book. Several chapters of the book are available only on-line. For assignments from those chapters, I will include a link to the web site on the class web page, which is at http://www.lasr.cs.ucla.edu/classes/cs111_summer2014. Reading assignments not from the book will have links on the web page to their location.

There are several lab assignments associated with this course. The syllabus shows their due dates. In most, but not all, cases, there will be one assignment due each week, to be turned in by the end of the day on Tuesday of that week. Carefully note, however, that there are some assignments due at other times. In particular, note that assignments start being due the SECOND week of class.

Week 1

June 24 Lecture 1: Introduction to the course and operating systems

      Reading assignment: Chapter 1 (pages 1-40)

June 26 Lecture 2: Hardware, modularity, and virtualization

      Reading assignment: Chapter 2, Section 2.1 (pages 43-60), Chapter 4, Section 4.1 (pages 148-166), Chapter 5, Section 5.1 (pages 200-210), Section 5.3-5.3.4 (pages 230-237)

June 27 Recitation section

Week 2

July 1 Lecture 3: Processes

       Reading assignment: Chapter 5, Section 5.5 (pages 255-272)

       ASSIGNMENT DUE: Lab 1A

July 3 Lecture 4: Scheduling

       Reading assignment: Chapter 6, Section 6.3 (pages 347-362)

       ASSIGNMENT DUE: Weensie OS 1

July 4 Holiday, no recitation section

Week 3

July 8 Lecture 5: Process communications, synchronization, and concurrency

       Reading assignment: Chapter 5, Section 5.2 (pages 210-230), Chapter 4, Section 4.2 (pages 167-173), Chapter 9, Section 9.1-9.1.7 (pages 9-2 through 9-20). Note: Chapter 9 is only available on line.

July 10 Lecture 6: Concurrency solutions and deadlock

       Reading assignment: Chapter 5, Section 5.2.5 (pages 221-222), Chapter 5, Section 5.6 (pages 273-284)

       ASSIGNMENT DUE: Lab 1B

July 11 Recitation section

Week 4

July 15 Lecture 7: Memory management

Reading assignment: Chapter 6, Sections 6.2-6.2.1 (pages 321-323)

These are not from the textbook. Links to them will be provided on the class web page.

Dynamic Storage Allocation: A Survey and Critical Review, by Paul Wilson, Mark Johnstone, Michael Neely, and David Boles. This is a very long paper. You are only required to read the following sections of it: Sections 1.1-1.3, sections 2-2.1 (pages 6-13), section 2.3 (only pages 21 and 22), section 2.4 (pages 24-28, up to the subsection titled "Profiles of some real programs"), and sections 3.3 and 3.4 (pages 42-45).

July 17 Lecture 8: Paging and virtual memory

Reading assignment: Chapter 5, Section 5.4 (pages 242-255), Chapter 6, section 6.2.2-6.2.9 (pages 323-347).

July 18 Midterm exam

Week 5

July 22 Lecture 9: File systems: Introduction

Reading assignment: Chapter 6, section 6.1 (pages 300-321), section 6.3.4 (pages 360-362)

ASSIGNMENT DUE: Lab 1C

July 24 Lecture 10: File systems: Naming and reliability

Reading assignment: Chapter 2, section 2.5 (pages 91-112), Chapter 8, Sections 8.1.1, 8.2.1, 8.3, and 8.5.4. Chapter 8 is an on-line chapter.

July 25 Recitation section

Week 6

July 29 Lecture 11: Networking for operating systems

       Reading assignment: Chapter 7, section 7.1.

       ASSIGNMENT DUE: Lab 2

July 31 Lecture 12: Networked and distributed file systems

       Reading assignment: Chapter 3, section 3.2, pages 132-138. Chapter 4, section 4.5, pages 184-195.

       These are not from the textbook. Links to them will be provided on the class web page.

       "A Survey of Distributed File Systems," M. Satyanarayanan, *Annual Review of Computer Science*, 1990. You only need to read sections 1, 2, 3.1, and 3.3. (A link will be provided on the class web site.)

August 1 Recitation section

Week 7

August 5 Lecture 13:   Distributed computing

       Reading assignment: These are not from the textbook. Links to them will be provided on the class web page.

       "Fallacies of Distributed Computing Explained," Amon Rotem-Gai-Oz.

       "What Cloud Computing Really Means," Eric Knorr, Galen Gruman, Infoworld.

       "Notes on Distributed Operating Systems," Peter Reiher.

       ASSIGNMENT DUE: Weensie OS 2

August 7 Lecture 14: Operating system security

       Reading assignment: Chapter 11, Overview and section 11.1, pages 11-4 to 11-28. This chapter is available only on-line. A link will be provided on the class web page.

August 8 Recitation section

       ASSIGNMENT DUE: Lab 3

Week 8

August 12 Lecture 15: Operating system security: cryptography, authentication, and protecting system resources

Reading assignment: Chapter 11, section 11.2 (pages 11-28 to 11-34), section 11.4 (pages 11-49 to 11-53), and section 11.6-11.6.3 (pages 11-72 to 11-80).

These are not from the textbook. Links to them will be provided on the class web page.

"Trusted Platform Module (TPM) Summary," available on-line. A link will be provided on the class web page.

August 14 Devices and device drivers

Reading assignment: These are not from the textbook. Links to them will be provided on the class web page.

"An Introduction to Device Drivers," Chapter 1 of "Linux Device Drivers," by Jonathan Corbet, Alessandro Rubini, and Greg Kroah-Hartman, published by O'Reilly, 2005.

"Understanding Modern Device Drivers," Asim Kadaf and Michael Swift, Proceedings of the seventeenth international conference on Architectural Support for Programming Languages and Operating Systems. 2012.

August 15 Final exam

August 16 (NOTE: THIS IS THE SATURDAY AFTER CLASS ENDS)

ASSIGNMENT DUE: Lab 4