Syllabus for CS 111 – Operating System Principles Summer 2015

The summer session is eight weeks long. There is no finals week. There will be 16 meetings of the class, plus eight 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_summer2015. 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

NOTE: Dr. Reiher is out of town for the first lecture, so during week 1 only we will swap the recitation section and one of the lectures. The class on Tuesday, June 23 will be handled by the TA, who will present some introductory material on the class as a whole and spend most of the time on getting students started on the Lab projects that constitute a major component of the class. Dr. Reiher will lecture on Thursday in the regular slot and during the Friday recitation section. In week 2, the schedule will be the normal one, with Dr. Reiher lecturing on Tuesdays and Thursdays and the TA giving a recitation section on the Friday.

June 23 Recitation section: Introduction to the class assignments and projects

      Reading assignment: Chapter 1 (pages 1-40)

June 25 Lecture 1: Introduction to the class

      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 26 Lecture 2: Hardware, modularity, and virtualization

Week 2

June 30 Lecture 3: Processes

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

     ASSIGNMENT DUE: Lab 1A

July 2 Lecture 4: Scheduling

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

     ASSIGNMENT DUE: Weensie OS 1

July 3 Recitation section

Week 3

July 7 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 9 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 10 Recitation section

Week 4

July 14 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 16 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 17 Midterm exam

Week 5

July 21 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 23 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 24 Recitation section

Week 6

July 28 Lecture 11: Networking for operating systems

      Reading assignment: Chapter 7, section 7.1.

      ASSIGNMENT DUE: Lab 2

July 01 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.)

July 31 Recitation section

Week 7

August 4 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 6 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 7 Recitation section

      ASSIGNMENT DUE: Lab 3

Week 8

August 11 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 13 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 14 Final exam

August 15 (NOTE: THIS IS THE SATURDAY AFTER CLASS ENDS)

ASSIGNMENT DUE: Lab 4