CIS 657
Syllabus
Fall 2003

Instructor: Steve Chapin
e-mail: chapin@ecs.syr.edu
Office: 3-114 CST, 443-2938
Office Hours: Tuesday 1:00–2:00, Weds. 11:00-12:00
additional times by appointment

TAs: 
Nishant Shenvi
e-mail: nshenvi@mailbox.syr.edu
Office: 1-118 CST
Phone: 443-5809
Office Hours: TBD

Abdulrahman Alarifi
aalarifi@ecs.syr.edu
1-120 CST
443-5811
TBD

Purpose
This is a graduate course in the design and implementation of operating systems. It covers
principles, design decisions and techniques, policies, and mechanisms. The course focuses
on the design and implementation of a general-purpose multiprogramming system for third
and fourth generation architectures. The goals are 1) to acquaint students with the compo-
nents and level organization of a hierarchically structured operating system, 2) to introduce
students to research literature, and 3) to show students how the abstractions underlying the
design choices in operating systems are translated into running code.

As this is a graduate course, students are expected to have taken an undergraduate
operating systems course, such as CSE 585 or CIS 586, or an equivalent at another institution.
Computer Engineering Master’s students should not attempt to fulfill their operating systems
requirement by taking CIS657.

Text
The text for this course is The Deisgn and Implementation of the 4.4BSD Operating System,
by Marshall Kirk McKusick, Keith Bostic, Michael J. Karels, and John S. Quarterman,

Students may also wish to pick up a book on installing and running FreeBSD, as this
is the operating system we will be using in the lab. It is not necessary for you to purchase
a CD-ROM, although you may wish to so that you have a copy of the software for use at
home. There are several such books, including those in the following list. We make no
specific recommendation on which one you might want to get.

• FreeBSD Unleashed, by Michael Urban, Brian Tiemann, Paperback - 1000 pages Bk &


Class Time
The official time for this class is 1:00-2:20 MW. I will be holding class from 1:00–2:30 MW. This will give us an additional 20 minutes throughout the semester, which is roughly equivalent to 3 class periods. We will use these three class periods in the following way:

• No class on 24 November.
• Midterm exam on 8 October.
• No class on 3 December; we will instead hold a review session.

Grading Policy
The grade for this course will be assigned based on:

1. Assessment Test (5%)
2. Homework and quizzes (approximately 15%)
3. Programming Assignments (approximately 40%)
4. Midterm Exam (approximately 20%)
5. Final Exam (approximately 20%)

I must stress that these are only approximate values. The final weights will be affected by the number of quizzes and homework assignments given.

Labs and Programming Assignments
There are three lab sessions for the course. You are not required to attend lab, but you are strongly encouraged to do so to get the most benefit from the TAs’ instruction. The times for the three lab sections will be announced on Wednesday, 27 August.

Lab sessions will take place in 1-110 CST. There are 10 workstations, so we can handle 20 students per lab (10 2-person teams). Because of the restriction imposed by the room size, you must sign up at the start of the semester for your lab time, and this will be on a first-come, first-served basis. If the lab you want to attend is full, then you should find someone who is willing to swap with you. This room is open for your using during non-reserved times (it will be reserved for other classes besides CIS657).

We expect to have three programming assignments throughout the course, written in C, with the following tentative topics:
1. CPU scheduling  
2. Virtual memory or device drivers  
3. Loadable Kernal Modules  

Remember, you will be working in teams. Before you can use the lab, you will need to sign the lab policy agreement that will be distributed in class. Students will also be required to sign and submit an honor statement with their labs. The statement must say, "Except for discussions with my lab partner, I have neither given nor received unauthorized aid on this assignment."

**Lab Schedule**

- **Week of 25 August**  No lab.  
- **Week of 1 September**  No lab.  
- **Week of 8 September**  Lab 0 (how to use the lab).  
- **Week of 15 September**  Lab 1 (Scheduling) handed out.  
- **Week of 22 September**  Lab 1.  
- **Week of 29 September**  Lab 1 due.  
- **Week of 6 October**  No lab; midterm week.  
- **Week of 13 October**  Lab 2 (VM/Device driver) handed out.  
- **Week of 20 October**  Lab 2.  
- **Week of 27 October**  Lab 2 due.  
- **Week of 3 Nov**  Lab 3 (Kernel Modules) handed out.  
- **Week of 10 Nov**  Lab 3.  
- **Week of 17 November**  Lab 3 due.  
- **Week of 24 November**  No lab (Edi Ul-Fitr/Thanksgiving break).  
- **Week of 1 December**  No lab (final exam prep).

**Late Policy**

All assignments must be turned in by the due date. There will be no extensions for any assignment. However, each student will have 72 “free late hours” to spend throughout the semester. It is up to you when you use them. I encourage you not to spend them all early in the semester, as scheduling conflicts, disasters, etc. will likely arise later and you’ll want them then.
Assessment Test

On the second day of class, 27 August 2003, there will be an in-class assessment test to help both students and the professor gauge the level of preparedness of the class. This test will count for 5% of the final grade. Students who do particularly poorly on the assessment test will be encouraged to drop the class.

Honor Policy

Student will work in teams, and each team is expected to do its own work. Unless explicitly given permission, you should not work with anyone from outside your team on the programming of your assignments. Discussion of concepts is fine, but your code should be your own. Code sharing is also a violation of this policy. Violation of this policy is grounds for failure from the course.

For each assignment and exam, students will be required to turn in a signed honor pledge (see note about labs; the tests will have the honor pledge typed on them for students to sign).

Assignments and exams submitted without a signed honor pledge will not be graded.

Class Notes

I will make my notes available on-line. My current web page is at

http://www.hpdc.syr.edu/~chapin/cis657.

This does not relieve you of the responsibility of reading the book or knowing its contents. While I will make a good-faith effort to have the notes available before class, you should not rely on this as a substitute for paying attention and taking notes. I give you these notes to relieve you of the drudgery of making them and to free your minds to concentrate in class.

Mailing Lists

We maintain two class mailing lists; one for questions from students to the TAs and professor, and one for information and answers flowing from the TAs and professor to the students. The first mailing list is cis657ta@hpdc.syr.edu, and the second is cis657@hpdc.syr.edu.

Exam Times

Midterm 8 October, 1300-1430, 102 Hall of Languages, chapters 1-5 and 14.

Final 10 December, 1015–1215, probably in 102 HoL.

The final is cumulative; this is necessary to fulfill the requirements set by the State of New York for our MS students in Computer Science. Approximately 67–75% of the material on the final will be from the second half of the course.
Lecture Schedule
This course will cover the following topics, with the following rough timetable (number of classes and planned dates is shown in bold):

1: **25 Aug** Introductory lecture. Presentation of syllabus and history and background of BSD Unix. (Chapters 1 and 2)

1: **27 Aug** Assessment test.

2: **3, 8 Sep** Design overview of BSD UNIX and kernel services (chapters 2 and 3).

2: **10, 15 Sep** System startup (chapter 14).

2: **17, 22 Sep** Process management (chapter 4). Scheduling assignment handed out during second class.

3: **24, 29 Sep; 1 Oct** Memory Management (chapter 5). Any time at the end of class will be devoted to student-driven review for the midterm.

1: **8 Oct** Midterm exam (fixed date; midterm will cover chapters 1-5, + 14).

3: **13, 15, 20 Oct** Midterm recap, and I/O systems and device drivers (chapter 6).

1: **22 Oct** Loadable Kernel Modules (not covered in book; FreeBSD specific).

7: **27, 29 Oct; 3, 5, 10, 12, 17 Nov** File systems and Filestores (chapters 7, 8, and 9).

2: **19 Nov, 1 Dec** Interprocess communication (chapter 11) and Network Communication (Chapter 12).

1: **3 Dec** Exam review.