0 Syllabus
cpe453 — Operating Systems I  
Section 03 (Nico)  
Spring 2019

Administrivia
Professor: Dr. Phillip Nico  
pnico@calpoly.edu  
Office: 14-205

Office Hours: in my office (14-205):  
Monday: 3:10pm–4:00pm¹  
Tuesday: 9:10am–10:00am¹  
Wednesday: 3:10pm–4:00pm¹  
Thursday: —  
Friday: 3:10pm–4:00pm¹  
or by appointment


You might also find the following books to be valuable resources:  

Webpage: http://www.csc.calpoly.edu/~pnico/class/2019-02/cpe453

Lecture: Section 3: MWF 10:10am–11:00am  
Lab: Section 4: MWF 11:10am–noon  
Midterm: Wednesday, May 8th, 2019 (subject to change)

Final²: (Unreliable. Verify with the schedule of classes.)  
Section 3: Monday, June 10, 2019 10:10am–1:00pm

Grading: The approximate grading breakdown (subject to change) is:  
Laboratory Exercises 15%  
Programming Assignments 25%  
Midterm 25%  
Final 35%

¹Office hours are guaranteed until the earlier of the posted end time or the time at which there are no more students.  
²There is a chance that the final will be moved to one of the common final times this quarter.
Course Objectives

The purpose of this course is to gain experience with and understanding of operating systems principles and implementation. In the process, you will:

- Examine the requirements of a modern operating system, including the fundamental problems of managing concurrent processes.
- Understand the system call interface to an operating system.
- Understand how an operating system gets started (boots) and takes control of the machine.
- Understand the design and implementation of a filesystem.
- Learn a bunch of other interesting things.

Prerequisites

The prerequisites for this course are cpe 225 or cpe 233 and cpe 357. Cpe 453 assumes proficiency at writing programs in the C language and understanding of the compilation, assembly, linking and loading processes, as well as understanding of contemporary computer architecture at the instruction set level.

If you have any doubts, come talk to me.

Course Format

The course consists of three lectures and three labs a week. The labs will not meet every time—possibly not ever—but I reserve the right to call lab meetings for demos or exercises, etc. You are responsible for all material covered in either lecture or lab. If you miss a class, consult a classmate for any missed materials.

The purpose of the class is for everyone to understand about operating systems and their implementation. To this end, if you don’t understand something during class, ask. If you are confused, it is likely that a few dozen of your classmates are as well. Also, listen to others’ questions. Many times you’ll think you understand a concept until you hear someone else’s question about it. Dialogue is the best way to learn things, so don’t be afraid to speak up.

Office Hours

Office hours are as listed above or by appointment. If you are unable to come to the posted office hours, contact me and we can arrange to meet. There is no reason why any of you should be unable to see me if you need to.

Other Resources

I will maintain a class web page at http://www.csc.calpoly.edu/~pnico/class/2019-02/cpe453. On it I will keep information, assignments, announcements, etc. If there any class announcements, corrections, etc., to be made, I will post them in the Announcements section of the class web page. Please check the web page regularly. I will try to make any announcements in class as well, but I cannot guarantee it, and you don’t want to miss anything.

I usually post my lecture notes on the web. These are guaranteed to be incomplete and are not a substitute for class attendance. They will, I hope, provide a framework for your own notes and emphasize what I think is important about the class.
Depending on how much time I have, I will also maintain a FAQ on the class page of questions from office hours that seem to be of general interest.

Laboratory Exercises and Programming Assignments

Programs:
There will be a number of assignments over the quarter. These will consist of some combination of programming exercises and reports on system modifications. Together they will represent 25% of the total final grade for the course. Because the total number is not known at this point, the individual program weights will not be determined until the end of the quarter. I expect there will be around 5 assignments over the quarter, but this may vary.

Programming assignments will be distributed on the web, and each assignment will specify both when it is due and whether or not partnerships are allowed.

Labs/Problem Sets:
Most weeks of the quarter there will be a set of laboratory exercises intended to supplement the coursework. These will consist of written exercises and/or experimental work to be performed in the lab. Submission requirements will be posted with each lab.

Late Policy:
Each student will be allowed three (3) discretionary late days to be applied over the quarter. One late day will be required for each calendar day (not work day) or portion thereof after the due date. To submit work after the submission directory for an assignment has been closed, use the latedays program to reopen it for you. Instructions will be provided on the class web site.

Note: There may be some assignments for which the use of late days will not be allowed. This would be to facilitate the posting of solutions before the midterm or some other reason like that. It will be noted on these assignments that late days are not permitted.

If you are unable to complete an assignment by the specified time and do not have any more late days, turn in what you have for partial credit. Late assignments will receive no credit.

Partnerships:
On some of the assignments you may be working with partners. Collaboration tends to help with figuring out difficult concepts and generally makes the whole process more pleasant. A word of caution, though: While it is tempting to just divide up the work, be sure each partner understands the whole project. Concepts learned on the assignments will show up on exams which are worth far more than the individual assignments in the final analysis. Even if your partner bails you out of a tight spot, be sure you understand the work, or it will come back to haunt you. Be absolutely certain that both partners’ names appear on all assignments. Credit will be given only to students whose names appear on the assignment. Each assignment will specify whether working with a partner is permitted.

Submitting Written Work:
Written work should be submitted in class on the day due or given to me in advance. If you use the CSC Department drop box (outside of 14-254) be sure that the names of the instructor, course, section, and assignment (in addition to your own name) are written clearly. Also be aware that materials dropped in the box after it has been collected for the day will be recorded the next day as late. If you are unsure whether the box has been emptied for the day, ask in the office.

For all written work, in order to facilitate grading:

- Write on only one side of the paper.
- Start a new page for a new problem if you will not be able to complete it on the current page.
- Place the problems in the order assigned.
• Fold your papers in half *lengthwise* and write your name (Last, First), the homework number, and the due date in the top right hand corner of the *outside* sheet.

• Do not write in red.

• Use proper English grammar and punctuation.

• Write legibly.

Neatness will not necessarily help you, but sloppiness will definitely hurt. If I can’t read it, I can’t grade it, and I will not guess at what you meant. (This also applies to exams.) These rules may seem extreme, but they are intended to make grading easier so I can return your papers more quickly.

**Submitting Programs:**

Programming assignments will be submitted online on the Computer Science Department CSL machines using the *handin* program. Instructions for submitting programs will be provided on the class web page.

When turning in programming assignments, be careful to submit your final version and to have tested it before submitting.

**Programs that fail to compile will receive no credit.**

**Exams**

There will be a midterm and a final. The midterm will be worth 25% of the final course grade and the final will be worth 35%. Exams will emphasize insight and problem solving ability rather than memorization.

**Missed Exams:** Makeup exams will only be given for the gravest of reasons. If you must miss an exam due to extreme illness, etc., contact the instructor (phone or email is fine) or leave a message with the Department of Computer Science office (805-756-2824) *before* the exam. Be sure to leave both the reason for missing the exam and how to reach you.

**Grading Policy**

The final grade for this course will be constructed of three components in the following proportions:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Exercises</td>
<td>15%</td>
</tr>
<tr>
<td>Programming Assignments</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm</td>
<td>25%</td>
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<tr>
<td>Final</td>
<td>35%</td>
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</tbody>
</table>

In general, letter grades will be computed according to the scale:

- Minimum A−: 90%
- Minimum B−: 80%
- Minimum C−: 70%
- Minimum D−: 60%

That is, if you score 90% on an exam you will be guaranteed at least an A− for that exam. On some assignments and exams the minimum cutoffs may (and probably will) be lowered to account for difficulty.

**Note:** I reserve the right to take other circumstances into account when assigning final grades. These include, but are not limited to, such things as substantial improvement over the quarter, significant differences between exam and homework performance, missing homeworks, etc.
Nothing would make me happier than to give everyone an A.

**Missing Assignments:** Unless special arrangements have been made in advance, a good-faith effort is required of each student for every program. Failure to submit a homework disqualifies the student from the top grade level possible for a final grade. Failure to submit two disqualifies from the top two levels, etc.

**Regrades:** In general, papers to be considered for regrades must be submitted within one week of the time they become available for picking up. The same is true for misrecorded grades. They must be reported within a week of their posting. Grade listings will be mailed out periodically as things are graded. Please check them to be sure they agree with your own records.

**Collaboration and Cheating**

**Policy on Collaboration**

Programming assignments in this class are intended to be demonstrations of individual or partnership abilities. To this end, programs are to be written only by the designated authors.

High-level discussion of problems and problem-solving techniques, however, is beneficial to all involved. You are encouraged to discuss approaches so long as those with whom you consult are given due credit in your program headers.

It is **never** acceptable to allow someone else to have your work for reference or to refer to someone else's work while writing your own.

In this case, “someone else’s work” means not only other students’ programs, but also materials from any other source, including, but not limited to, the Internet, other reference books, or previous course materials. Also, “not giving your work to others” includes taking reasonable precautions to prevent them from taking it.

Collaboration that goes beyond general approaches or that is uncredited will be considered cheating. If you are unsure about what constitutes proper or improper collaboration, consult the instructor for guidance.

**Policy on Cheating**

Don’t. I consider academic dishonesty a serious offense. Any instances of cheating or plagiarism will be referred to the Office of Student Rights and Responsibilities. The Cal Poly rules and policies are listed in the catalog as well as at the OSRR web site, [http://www.osrr.calpoly.edu](http://www.osrr.calpoly.edu). The general policy, however, is very simply stated in the Campus Administrative Manual (C.A.M. 684):

Чeating requires an “F” course grade

Turning in work is presumed to be a claim of authorship unless explicitly stated otherwise. If the course rules are unclear or you are unsure of how they apply, ask the instructor beforehand.

**Feedback**

One of the frustrations of teaching is that the instructor rarely gets any feedback on the course until the teaching evaluations at the very end when it is too late to do anything about it. If you like, dislike, or don’t understand something I’m doing with the course, please stop by my office hours, send me email, or paste together a note from newspaper clippings and drop it in my mailbox. I won’t always change things, but I will always explain why I’m doing them the way I am.

**Tentative class schedule**

The tentative schedule for the course is given on page 8. This is what we hope to accomplish and when we hope to accomplish it. There may be changes, but this is a rough roadmap for the quarter.
**Spring 2019 Preliminary Course Outline**

(Subject to Change)

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Topic</th>
<th>Reading</th>
<th>Date</th>
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<td>2</td>
<td>Cesar Chavez Birthday (observed)</td>
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<td>Introduction and Background</td>
<td>Chapter 1</td>
<td>April 1</td>
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<td>History</td>
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<td>The Process Model</td>
<td>Chapter 2</td>
<td>April 8</td>
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<td>Processes, cont.</td>
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<td>Operating System Structures</td>
<td>April 10</td>
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<td>3</td>
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<td>Concurrency</td>
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<td>Concurrency, cont.</td>
<td>April 15</td>
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<td>April 17</td>
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<td>Wrapping up Concurrency</td>
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<td>11</td>
<td>Scheduling</td>
<td>Chapter 3</td>
<td>April 22</td>
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<td>Input and Output</td>
<td>April 24</td>
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<td>Device Management</td>
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<td>IO Systems and Deadlock</td>
<td>April 29</td>
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<td>Memory Systems</td>
<td>Chapter 4</td>
<td>May 6</td>
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<td>May 13</td>
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<td>Page Replacement Algorithms</td>
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<td>Virtual Memory Wrapup</td>
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<td>Filesystems</td>
<td>May 22</td>
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<tr>
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<td>26</td>
<td>Directory Schemes</td>
<td>May 24</td>
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<td>9</td>
<td>26</td>
<td>Index Schemes</td>
<td>May 27</td>
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<td>Other filesystems</td>
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<tr>
<td>10</td>
<td>29</td>
<td>Wrapping up Filesystems</td>
<td>June 3</td>
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<tr>
<td>10</td>
<td>29</td>
<td>Wrapping up</td>
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<td></td>
<td>Final Exam</td>
<td>Monday, June 10m 10:10am–1:00pm (Verify with published schedule)</td>
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</tbody>
</table>

2Last day to drop classes is Thursday, April 11.
The Last Page

This page is so I can gather a little information about you at the beginning of the class. Please fill it out, tear it off and leave it with me on the way out.

Who are you?

Name: __________________________
Section: _________________________
Major: __________________________
Email: __________________________

Class Expectations?

Please take a minute to write out what your goals and expectations are for cpe 453. What do you want to learn?

I hate to do this, but to be sure there’s no confusion on the matter...

Below, please copy the two boxed text segments from page 5 about academic dishonesty and sign the pledge (assuming you will comply, of course). Without this you will automatically receive a grade of zero for all assignments.

1)

2)

Pledge

I will do my own work in this class. That is, unless it is explicitly permitted by the assignment, I will neither use others’ work as my own nor make my work available for others to use. I understand that either of these actions constitutes cheating sufficient to merit a grade of F for the course.

Signature ______________________ Date ____________