

**Point Loma Nazarene University**  
**CSC 314: Operating Systems (4 units)**  
**Spring 2018**

**Instructor:**

Dr. Lori Carter

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**Office hours:**

MWF 12:30-2:15 1:00-2:00

F 8:00-9:30

T 11:00-11:45

R 11:00 - 1:00

**Course Time and Location:**

MWF 10:55-12:05 RS 13

**Texts:**

Silbershatz et.al, Operating System Concepts Essentials. Second ed. and Andersen, Paul, Just Enough Unix, Fifth ed. You will need both books right away!

**Course Catalog Description:**

A systems course focusing on operating systems, topics include basic operating system design, process management, device management, memory management, and file systems. Students are introduced to the basics of software evolution, reliability, concurrency, security and protection in the context of single-core, multi-core, distributed, and virtual environments. Class members gain experience using both GUI and command-line interfaces. In the course of implementing the CPU scheduling simulation, students understand the importance of thorough system testing and attention to system specs as they try to make parts of their systems work with those designed by their teammates.

**Class Learning Outcomes**

- Students will understand the interaction between hardware and software.
  - Students will be able to explain the purpose of the Operating System, and where it fits into the computer system as a whole
  - Students will be able to evaluate how a change in one part of the operating system will affect the operating system as a whole.
  - Students will develop a working knowledge of the UNIX/Linux operating systems
  - Students will be able to take from theory to design to implementation a module of an operating system.
- Students will have an understanding of the historical development, contemporary progress and societal role of computer science.
  - Students will be able to list the 5 tasks of the operating system, describe what each is, and justify why it is important.
- Students will be able to collaborate effectively in teams

**Course Organization:**

**Lectures:** Cover the highlights of chapters assigned – not a substitute for reading. Student versions of the lecture slides can be obtained from Canvas. These slides will contain homework assignments and due dates.

**Graded review activities:** Frequently on Fridays (potentially other days), in lieu of homework, there will be some kind of **graded** in-class activity reviewing what was learned the previous week or 2. It may be a quiz, it may be an essay question, it may be a group activity or some combination. Review activities cannot be made up, however 1 will be dropped. You might find the homework problems at the back of each chapter helpful in

preparing. You will definitely find the slides, lab questions, and text helpful! You may use any **strictly** hand-written notes (written by you) during the activity.

**Labs:** Frequent labs based on the Linux/Unix operating systems, from the book, *Just Enough Unix* and other sources will be assigned. Lab sessions are mandatory. Unless otherwise stated, labs are due by the beginning of the next class period after they were assigned. If the lab requires a demonstration, you will be given one opportunity to demonstrate it. It will either be signed off as correct, or I will make notes regarding what worked and what didn't. **No late labs are accepted** but I will drop the lowest lab grade. An unfinished lab may be turned in on time for partial credit. Labs will contain questions that require analysis and thought. Often, a large point value will be assigned to these answers. **They should be original, and in your own words.** If it appears that 2 (or more) people have turned in 1 lab, I will split the points or potentially give each person a zero.

**Exams:** There will be 2 exams in addition to the final exam. These will only cover material presented since the last exam. If you will miss an exam for a school function, you must arrange to take it in advance. **If you ever miss an exam without giving me prior notice, there is a good chance you will receive a zero unless, of course, there was clearly an emergency.** Exam 1 is scheduled for **Feb. 14**. It will cover chapters 1 – 4 plus the appropriate chapters in the Unix book. Exam 2 is scheduled for **April 9** and will cover chapters 5-8 in your text. **Final Exam:** Cumulative exam with an emphasis on material covered in the last part of the semester. The final is scheduled for the **Friday of finals week at 10:30 AM.**

**Final Exam: Date and Time:**

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

**Simulation Project:** A 3-week programming project based on process scheduling will be assigned. The entire project is due March 23, but there will be several intermediate due dates as well. In order to get full credit, all intermediate dates must be met as well as the final date. Unless otherwise stated, late portions are not accepted. **Most aspects of this project (exceptions will be noted) must be completed using basic Linux/UNIX tools (non-GUI).** Programs will be written in C++ using the basic Linux Operating System (command-line) and g++ compilers. All written projects will be completed using a Linux/Unix text editor.

**Grading:**

Review activities	12%	Scheduling Project	10%
Exams	30%	Final	23%
Labs	25%		

Final grades will be determined as follows:

100-93%	A	80-82.9%	B-	67-69.9%	D+
90-92.9%	A-	77-79.9%	C+	63-66.9%	D
87-89.9%	B+	73-76.9%	C	60-62.9%	D-
83-86.9%	B	70-72.9%	C-	0-59.9%	F

**University Mission:**

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

**Department Mission:**

The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the

passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

### **Attendance:**

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See [http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class\\_Attendance](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance) in the Undergraduate Academic Catalog.

### **Class Enrollment:**

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

### **Academic Accommodations:**

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at [DRC@pointloma.edu](mailto:DRC@pointloma.edu). See [Disability Resource Center](#) for additional information.

For more details see the PLNU

catalog: [http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic\\_Accommodations](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Accommodations)

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

### **Academic Honesty**

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic\\_Honesty](http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty) for definitions of kinds of academic dishonesty and for further policy information.

### **Copyright Protected Materials:**

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

### **Credit Hours:**

In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 4 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

CSC 314 Expected Schedule Spring 2018

Monday	Tues	Wednesday	Thurs	Friday
Syllabus 1.1-1.3 intro to OS and systems	Jan 9 Mon sched	10 1.4-1.6-1.9 OS operations	11	12 1.11-1.12 and Intro to Linux/Unix tutorial
15 MLK	16	17 Unix ch 6, Unix file system: Linux lab 2 (unix book)	18	19 Review activity OS 2.1-2.3 OS interfaces, C lab (Unix book)
22 C quiz for lab grade Systems calls: OS chapt 2.4-2.5 Systems calls lab	23	24 OS chapt 2.6-2.10: OS design and implementation	25	26 Review activity chapter 2 Lab: Emacs & C++ (Unix book)
29 OS Chapter 3.1-3.4 – introduction to processes	30	31 OS chapter 3.5-3.6 inter-process communication	Feb 1	2 Unix shells, scripting Unix shells, scripting lab (unix book)
5 OS chapter 4 - threads	6	7 Finish threads Threading lab 1	8	9 Review activity chapters 3, 4 Threading lab 2
12 Discuss lab results, exam review	13	14 Exam 1 (OS and Unix)	15	16 OS 5.1-2, concurrency lab
19 OS 5.3-5.6 solutions to critical section problem	20	21 OS 5.11 deadlock	22	23 Makefile lab
26 OS chapter 6.1-6.3.2: Intro to CPU scheduling Introduce scheduling project	27	28 FCFS test cases due Discuss FCFS algorithm	Mar 1	3 Makefile driver testing SJF test cases due
5 Sp break	6	7 Sp break	8	9 Sp break
12 FCFS module due Discuss SJF algorithm	13	14 OS 6.3-6.4 Preemptive scheduling algorithms	15	16 6.5-6.7 Multi-processor and real time scheduling SJF module due
19 RR and SJR test cases due	20	21 OS chapter 7.1-7.4 Memory management	22	23 SJR or RR due, analysis due More 7.1-7.4
26 7.5-7.6 paging	27	28 Review activity OS chapter 8.1-8.4 Demand paging	29 Easter Break	30 Easter Break
Apr. 2 Easter Break	3	4 8.5-8.8 Memory Allocation	5	6 Finish chapter 8, review
9 Exam 2	10	11 OS chapter 9.1-9.4 Mass storage management	12 Easter	13 OS 9.5-9.8 Disk management
16 OS Chapter 10: File Systems	17	18 OS: chapter 11.1-11.4: File allocation	19	20 Review activity chapters 9-10 OS: 11.4-11.5 Free space management
23 OS 12: IO system basics	24	25 OS 13,14 Protection and Security basics	26	27 review
May 1	2	3	4	5 10:30 CSC 314 final