# CPSC 380-01 Operating Systems

# Spring 2020

# Course Syllabus

## General Information

Instructor: Tom Springer (springer@chapman.edu)

Lecture: Keck Center 153, *M/W 4:00pm-5:15pm, (Section 01))*

Office Hours: *Hashinger Science Center 201, T/TH (1:00 – 3:30 pm.)*

## Course Description

The course emphasizes the major principles of operating system design and the interrelationship between the operating system and the hardware.

## Course Learning Outcomes

Students will obtain an overall understanding of operating system design and implementation. Students will be able to write Linux shell scripts and C/C++ programs that demonstrate multi-programming, process coordination, process scheduling, deadlock avoidance, interface device implementation memory management, protection and security.

## Program Learning Outcomes

## The Chapman experience creates outcomes which are consistent with our identity. Similar to the General Education program, each degree program, or major, at Chapman has a unique set of learning outcomes, or student abilities that are not only related to Chapman's institutional mission and goals, but also unique to the student's discipline or field of study. For more information, [Fowler School of Engineering Program Learning Outcomes](https://docs.google.com/document/d/1OESCtPUolnWFV_qRFuRzNrzxmUtYr5H-dFaYVmPUKY0/edit?usp=sharing).

## Overview

CPSC 380 is an introductory course designed to introduce students to operating system design and implementation, process coordination and scheduling, deadlocks, interface devices, memory and device management, networks and security.

## Required Text

*Operating Systems, Concepts (9th ed), Silberchatz, Galvin and Gagne, Wiley 2013*

*Linux Operating System (Preferred)*

## Course Materials

All course materials will be made available via the course site on[*Blackboard*](https://blackboard.chapman.edu/) when possible. Blackboard will also be used for submitting assignments, viewing grades

## Course Grade Breakdown

Grading scale used for the course. This is an absolute scale. Your particular grade will be determined by your overall percentage.

|  |  |
| --- | --- |
| *Grade* | *Letter Grade* |
| *93+* | *A* |
| *90-92.9* | *A-* |
| *87-89.9* | *B+* |
| *83-86.9* | *B* |
| *80-82.9* | *B-* |
| *77-79.9/73-76.9/70-72.9* | *C+/C/C-* |
| *67-69.9/63-66.9/60-62.9* | *D+/D/D-* |
| *<60* | *F* |

*You must score a 70 or above to receive a P when taking the course P/NP.*

## Assignments

Assignments will consist of a number of written assignments as well as a number of small programming assignments and one larger project-based programming assignment due at the end of the semester. Written and programming assignments are to be turned in by 11:59pm on the day they are due and will be submitted through Blackboard. Coding is to be done in C/C++ though C may be easier due to the amount of low-level coding. You can develop on any Linux platform but make sure the code runs the way you want it to on a CentOS Linux platform.

## Late Policy

Written homework and small programming assignments will have up to a 5-day grace period to turn in late. However, each day the assignment is late 20% of the total score will be deducted. Assignments will no longer be accepted starting on the 5th late day. Late submission for the term project assignment will not be accepted. ***This includes instances of not hitting submit or submitting incorrect files. You are responsible for ensuring the correct files are submitted by the deadline.*** *The timestamp on a file that missed a deadline is not valid.*

## Participation and Quizzes

It is expected that students attend every lecture. Participation in these sessions will contribute to the final course grade.

## Exams

There will be a midterm (in class) that will cover the material up to that point. The final is comprehensive but will concentrate on the material covered in the second half of the course. No make-up exams will be allowed

## Grading Percentages Breakdown (subject to change):

Class Participation 10%

Homework & Project 25%

Midterm 30%

Final 35%

## Assignment Grading

All assignment will be graded by myself. Any questions concerning late submission or assignment grade inquiries should be directed to me via email. By all means approach me before or after class to ask questions.

## Final Exam Time

Section 01: Monday, May 18th: 4:15-6:45pm

## Collaboration Policy

You have much to learn from your colleagues, and so I encourage you to discuss and study course material together. However, all work you submit for this course must be your own, and must be completed individually unless otherwise specified. More specifically, you may not present source code or programs copied from the Internet, other texts, other students, etc. as your own work. Of course, you are free to use whatever *reference* materials you like, but please cite them in the header of the source code comments or a README turned in with your assignments. A README is a .txt document with a list of all reference materials used to aid in the assignment as well as names of other classmates you collaborated with. I assume you are familiar with Chapman’s policy on academic misconduct, it is presented below and any incidents of academic misconduct or dishonesty will be dealt with severely in accordance with this policy.

## Expectations and Technology Use

I expect that everyone will maintain a classroom conducive to learning. I like an informal atmosphere, but it must be orderly. Thus, everyone is expected to behave with basic politeness, civility, and respect for others. In particular, talking in class is okay if it’s part of a class discussion or with me. Private communications are not permitted, especially during exams. Neither are reading extraneous materials, using electronic equipment off task, or sleeping. As this is a Computer Science class, technology is allowed to aid in learning and understanding material. However, please do not use a personal device for any purpose unrelated to our class. All devices should be silenced. Cell phones should be put away. Suggestions for improvement are welcome at any time. Any concern about the course should be brought first to my attention.

## Technology Requirements

This course will require your use of the software tool VirtualBox 5.2.xx <https://www.virtualbox.org/wiki/Download_Old_Builds_5_2> and CentOS 7 on a VirtualBox pre-installed image. We will walk through installation and use in class, however, it is your responsibility to ensure you have a working computer with the required software installed and functional for this course.

## Chapman University’s Academic Integrity Policy

Chapman University is a community of scholars that emphasizes the mutual responsibility of all members to seek knowledge honestly and in good faith.  Students are responsible for doing their own work and academic dishonesty of any kind will be subject to sanction by the instructor/administrator and referral to the university Academic Integrity Committee, which may impose additional sanctions including expulsion.  Please see the full description of Chapman University's policy on [Academic Integrity](https://www.chapman.edu/academics/academic-integrity/index.aspx).

## Chapman University’s Students with Disabilities Policy

In compliance with ADA guidelines, students who have any condition, either permanent or temporary, that might affect their ability to perform in this class are encouraged to contact the Office of Disability Services. If you will need to utilize your approved accommodations in this class, please follow the proper notification procedure for informing your professor(s). This notification process must occur more than a week before any accommodation can be utilized. Please contact [Disability Services](http://www.chapman.edu/students/health-and-safety/disability-services/index.aspx) at (714) 516–4520 if you have questions regarding this procedure or for information or to make an appointment to discuss and/or request potential accommodations based on documentation of your disability. Once formal approval of your need for an accommodation has been granted, you are encouraged to talk with your professor(s) about your accommodation options. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course.

## Chapman University’s Equity and Diversity Policy

Chapman University is committed to ensuring equality and valuing diversity. Students and professors are reminded to show respect at all times as outlined in Chapman’s Harassment and Discrimination Policy. Please review the full description of [Harassment and Discrimination Policy](http://www.chapman.edu/faculty-staff/human-resources/eoo.aspx). Any violations of this policy should be discussed with the professor, the Dean of Students and/or otherwise reported in accordance with this policy.”

## Student Support at Chapman University

Over the course of the semester, you may experience a range of challenges that interfere with your learning, such as problems with friend, family, and or significant other relationships; substance use; concerns about personal adequacy; feeling overwhelmed; or feeling sad or anxious without knowing why. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. You can learn more about the resources available through Chapman University’s [Student Psychological Counseling Services](https://www.chapman.edu/students/health-and-safety/psychological-counseling/).

Fostering a community of care that supports the success of students is essential to the values of Chapman University.  Occasionally, you may come across a student whose personal behavior concerns or worries you, either for the student’s well-being or yours.  In these instances, you are encouraged to contact the Chapman University [Student Concern Intervention Team](https://www.chapman.edu/students/health-and-safety/student-concern/index.aspx) who can respond to these concerns and offer assistance. While it is preferred that you include your contact information so this team can follow up with you, you can submit a report anonymously.  24-hour emergency help is also available through Public Safety at 714-997-6763.

## Religious Accommodation

Religious Accommodation at Chapman University Consistent with our commitment of creating an academic community that is respectful of and welcoming to persons of differing backgrounds, we believe that every reasonable effort should be made to allow members of the university community to fulfill their obligations to the university without jeopardizing the fulfillment of their sincerely held religious obligations. Please review the syllabus early in the semester and consult with your faculty member promptly regarding any possible conflicts with major religious holidays, being as specific as possible regarding when those holidays are scheduled in advance and where those holidays constitute the fulfillment of your sincerely held religious beliefs.

## Changes

This syllabus is subject to change. Updates will be posted on the course website.

**Spring 2020 Class Schedule**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Date* | **Type** | **Subject** | **Reading** | **Assignments Out** |
| ***02/03*** | **Lecture** | **Part I: Overview** |  |  |
| *02/05* | Lecture | Introduction to Operating Systems | Ch. 1.1 – 1.12 |  |
| *02/10* | Lecture | Operating-System Structures | Ch. 2.1-2.8 |  |
| *02/12* | Lab | Install of VirtualBox and CentOS VM |  | Hw #1 |
| ***02/17*** | **Lecture** | **Part II: Process Management**  Processes | Ch. 3.1 – 3.6 |  |
| *02/19* | Lab | Linux Processes | Notes | Assign #1 |
| *02/24* | Lecture | Threads | Ch. 4.1 – 4.5 |  |
| *02/26* | Lab | POSIX Threads | Notes | Assign #2 |
| *03/02* | Lecture | Processing Synchronization | Ch. 5.1 – 5.9 |  |
| *03/04* | Lab | Inter-Process Communication- Semaphores | Notes | Assign #3 |
| *03/09* | Lecture | CPU Scheduling | Ch. 6.1-6.3, 6.4-6.8 |  |
| *03/11* | Lab | Inter-Process Communication:  Pipes & Message Queues | Notes | Assign #4 |
| *03/16* | Lecture | Deadlocks | Ch. 7.1 – 7.7 |  |
| *03/18* | Lab | Process/Thread Deadlocks | Notes | Assign #5  Hw #2 |
| ***03/23*** |  | **No Class – Spring Break** |  |  |
| ***03/25*** |  | **No Class – Spring Break** |  |  |
| *03/30* |  | Midterm Review |  |  |
| ***04/01*** |  | **Midterm** |  |  |
| ***04/06*** | **Lecture** | **Part III: Memory Management**  Main Memory | Ch. 8.1 – 8.6 |  |
| *04/08* | Lab | Memory Management |  | Assign #6 |
| *04/13* | Lecture | Virtual Memory | Ch. 9.1 – 9.7 |  |
| *04/15* | Lab | Inter-Process Communication:  Shared Memory |  | Assign #7  Hw #3 |
| ***04/20*** | **Lecture** | **Part IV: Storage Management**  Mass-Storage Structure | Ch. 10.1-10.6 |  |
| *04/22* | Lecture | File-System Interface | Ch. 11.1 – 11.9 |  |
| *04/27* | Lecture | File-System Implementation | Ch. 12.1 - 12.6 |  |
| *04/29* | Lab | File System I/O | Notes | Assign #8 |
| *05/04* | Lecture | I/O Systems | 13.1-13.6 |  |
| *05/06* | Lab | Standard I/O Library | Notes | Assign #9  Hw #4 |
| ***05/11*** | **Lecture** | **Part V: Protection & Security**  Protection & Security | Ch. 14.1 - 14.7  Ch. 15.1-15.7 |  |
| *05/13* | *Lab*  *Lecture* | *Protection & Security*  *Final Review* |  | Hw #5  Assign #10  Projects Due |
| ***05/18*** | **Exam** | **Final Exam** |  |  |