San José State University
College of Engineering/Computer Engineering Department
CS 149-05, Operating System Design, Spring 2021

Course and Contact Information

Instructor:	Jahan Ghofraniha
Office Location:	Online through zoom
Email:	jahan.ghofraniha@sjsu.edu
Office Hours:	T-Th 5:30-6:00 PM or by appointment through zoom Zoom link: https://sjsu.zoom.us/j/86994351131?pwd=OXI2RVVZTWcybW9EN WFSZnJSR1R0Zz09
Class Days/Time:	T-Th 6:00 – 7:15 PM Zoom link: https://sjsu.zoom.us/j/86994351131?pwd=OXI2RVVZTWcybW9EN WFSZnJSR1R0Zz09
Classroom:	Online through zoom
Prerequisites:	CS 146 (with a grade of "C-" or better)
TA/ISA	TBD

Course Description

This course establishes the foundation for understanding the design of a modern Operating System. The course covers an overview, history of OS development, basic concepts, and the structure of operating system. The course addresses the most important functions offered by an operating system including the synchronization and scheduling of process and threads, the virtual memory and memory management, and Input/Output and file system. The course will also touch on other issues such as system calls and device drivers for hardware independence, kernel and shell, and protection.

Course Goals and Learning Outcomes

CS 149 is an operating system class with the goal to equip students who do not have a sufficient Computer Science/Engineering background to understand the management of the critical resources in a computer system. The course emphasizes on the efficient and secure allocation of CPU and the memory to multiple users in a multiprocessing environment.

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

1. Have an ability to know the concepts and principles underlying the structures and designs of operating systems.

2. Have an ability to know processes and threads and their roles in program execution.

3. Have an ability to know scheduling and synchronizing processes/threads.

4. Have an ability to know computer's main memory management.

Required Texts/Readings

Textbook

Operating Systems Concepts, by Silberschatz, Galvin and Gagne
10th Edition, Wiley, ISBN: 978-1119456339

Other Readings

Reference Book

Modern Operating Systems, Third Edition, by Andrew S. Tanenbaum and Herbert Bos,

Pearson, ISBN -10: 0-13-359162-X

Additional reading material will be distributed to the class as appropriate.

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

Project: One-to-three students form a team to do a project related to the design and implementation of resource management and allocation in an operating system. The specific topics of the project can come from the textbook or be chosen by the team. Each team will identify a problem and use the techniques taught in the class to solve the chosen problem. Each team will document the finding in a written report and deliver a presentation/demo in class. The grades are based on the understanding of the problem, the completeness of the report, and the quality of the presentation.

Examinations: There will be one midterm and one final examinations.

Homework & quizzes: Homework problems will be posted on Canvas and announced in class. Open discussion is encouraged, however, the work and submission is individual. **No late homework will be accepted**. Quizzes will be given throughout the semester, normally after each topic to assess students' grasp of the key topics.

Discussion Forums: There will be a weekly discussion forum where a few questions are posted to the forum. All students are required to review the lecture notes and research the posted topics and post their answers to the posed questions to the discussion board. This is a graded activity.

NOTE that University policy F69-24, "Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading."

Grading Policy

The grading percentages will be as follows.

Project	20%
--Abstract	1%
--First Two Chapters	2%
--Design Review	2%
--Project Report	10%
--Project Presentation	5%
Homework	20%
Discussion Forum	10%
Midterm Exam	25%
Final Exam	25%
Total	**100%**

The instructor reserves the right to change the percentages
Failure to complete and submit 90% of homework and project assignments will result in a failing grade in this class.

No late work will be accepted.

Grading

A= 100-93; A- = 90-92.99; B+ = 88-89.99; B= 83-87.99; B- = 80-82.99; C+ = 78-79.99; C= 73-77.99; C- = 70-72.99; D+ = 68-69.99; D = 63-67.99; D- = 60-62.99; F= <60.

Classroom Protocol

- Students are encouraged to ask questions in the class.
- Each student is required to engage in classroom activities, submit assignments and reports on time, and take exams and tests on time.

University Policies

Per University Policy S16-9 *(http://www.sjsu.edu/senate/docs/S16-9.pdf)*, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (http://www.sjsu.edu/gup/syllabusinfo), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

CS 149-05 Course Schedule, Spring 2021

The schedule (tentative) is subject to change with fair notice before the class.

Week	TOPIC	Homework & quizzes
1	Class information and overview Introduction & OS Structure	
2	OS structure II	Hw 1 announced
3	Processes	Hw 1 due
4	Threads/Synchronization I	Discussion Forum 1 announced
5	Synchronization II Deadlock	Discussion Forum 1 due, Hw 2 announce
6	CPU Scheduling	<Project Abstract due> <First Two Chapters of Project Report due>
7	Memory Management/ Virtual Memory	Hw2 due, Discussion forum 2 announced
8	I/O System/Virtual Machine	Discussion forum 2 due, hw 3 announced
<mark>9</mark>	<mark>**Midterm exam review**</mark> <mark>**Midterm Exam (Online)**</mark>	
<mark>10</mark>	<mark>**Spring Recess**</mark>	
11	File System	Hw 3 due, Discussion forum 3 announced
12	Project Review	Discussion forum 3 due, Hw 4 announced
13	Security	Hw 4 due
14	Case study: Linux system	<Project report due>
15	Project Presentation	Project evaluation
16	Project presentation	Project evaluation
<mark>17</mark>	<mark>**Thursday, May 20 Online**</mark> <mark>**Final Exam (17:15—19:30)**</mark>	