



# CS 492 Operating Systems Syllabus

Department of Computer Science/SES  
Spring 2021

Lecture:	MWF Section A: 9:00-9:50, Sections B & C: 10:00-10:50
Location:	Zoom (available though Canvas)
Instructors:	Georgios Portokalidis (Sections A & B) Jun Xu (Section C)
Web:	See Canvas and <a href="https://www.portokalidis.net/cs492_2021s.html">https://www.portokalidis.net/cs492_2021s.html</a>
Communications:	Piazza
Office hours:	G Portokalidis: By appointment (zoom) Jun Xu: 3PM - 5PM Wed (zoom)
Gradescope:	<a href="https://www.gradescope.com/courses/241080">https://www.gradescope.com/courses/241080</a>
Location:	Zoom (available though Canvas)
TAs:	Brad Bachrach Dennis Zhang Tarquin Bennett Enes Goktas

## COURSE DESCRIPTION

The use and internals of modern operating systems: lectures focus on internals whereas programming assignments focus on use of the operating system interface. Major topics include: the process concept; concurrency and how to program with threads; memory management techniques, covering virtual memory and shared libraries; file system data structures; and I/O.

Prerequisites: CS 382 and CS 392

# STUDENT LEARNING OUTCOMES

I am able to explain how preemptively scheduled processes and threads provide an abstraction that a program is the only one executing.
I am able to explain how virtual memory provides an abstraction of physical memory.
I am able to explain how an operating system's input/output architecture provides an abstraction that every data source or sink behaves identically.
I am able to explain in detail how a system call is made and returns.
I am able to write a multi-threaded C program that uses at least one classical synchronization mechanism to solve at least one classical synchronization problem.

## COURSE FORMAT AND STRUCTURE

This course is fully online. To access the course, please visit [stevens.edu/canvas](http://stevens.edu/canvas). For more information about course access or support, contact the TRAC by calling 201-380-6599 or 201-216-5500.

### Communication

This term we will be using Piazza for class discussion. **All sections will use the same piazza environment. Invitations have been sent to all students. If you haven't received an invitation please contact the TAs!**

The system is highly catered to getting you help fast and efficiently from classmates, the TA, and the instructor. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email [team@piazza.com](mailto:team@piazza.com). Piazza will also be used during lectures for live Q&A with the instructor.

### Online Etiquette Guidelines

Your instructor and fellow students wish to foster a safe online learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea but you are not to attack an individual. Our differences, some of which are outlined in the University's inclusion statement below, will add richness to this learning experience. Please consider that sarcasm and humor can be misconstrued in online interactions and generate unintended disruptions. Working as a community of learners, we can build a polite and respectful course ambience. Please read the Netiquette rules for this course:

- Do not dominate any discussion. Give other students the opportunity to join in the discussion.
- Do not use offensive language. Present ideas appropriately.

- Be cautious in using internet language. For example, do not capitalize all letters since this suggests shouting.
- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
- Keep an open mind and be willing to express even your minority opinion.
- Think and edit before you push the “Send” button.
- Do not hesitate to ask for feedback.

## Virtual Office Hours

Virtual Office Hours are a synchronous session (through Zoom) to discuss questions related to weekly readings and/or assignments. Office hours are:

- Georgios Portokalidis: By appointment (zoom)
- Jun: 3PM - 5PM Wed (zoom)

To connect to the weekly session, look for the zoom meeting under the Zoom menu on Canvas.

## COURSE REQUIREMENTS

**Study zyBook chapters and complete activities before the lectures.** Before every lecture, students need to study the chapters corresponding to the topic that will be covered and complete the activities contained therein.

**zyBook challenge activities.** Complete challenge activities at the end of each chapter.

**Canvas quizzes.** 4 quizzes will be given, covering all course/reading materials, to be completed online over canvas. Quizzes will be scheduled in advance.

**Participation.** Students are expected to participate in lectures and piazza conversations by asking questions and discussing the topics in assigned reading the topics covered in the lecture.

**Individual assignments.** Students will need to complete 4 individual assignments that should be completed in one or two weeks. The code for programming assignments must be maintained in a Git repository for which the instructor and/or the CAs/TAs have access. All assignments must be also submitted through Canvas or Gradescope.

**Group project** A software-development project will be given by the middle of the semester to be completed by groups of up to 3 students. The code must be maintained in a Git repository for which the instructor and/or the CAs/TAs have access. The code must be also submitted through Canvas or gradescope.

# COURSE MATERIALS

## Mandatory Textbook/zyBook

1. Sign in or create an account at learn.zybooks.com
2. Enter zyBook code
3. Subscribe

A subscription is \$58. Students may begin subscribing on Jan 18, 2021 and the cutoff to subscribe is May 07, 2021. Subscriptions will last until Jun 03, 2021.

Make sure to use your Stevens email address when registering.

## Other readings

- Modern Operating Systems (4th Edition), Andrew S. Tanenbaum, Herbert Bos
- Linux Device Drivers 4th Edition (3rd Edition is also good) <https://lwn.net/Kernel/LDD3/> (open-source)
- Materials posted on Canvas

## Optional

- Understanding the Linux Kernel, any Edition

# TENTATIVE COURSE SCHEDULE

Topic	Reading
Introduction	zyBook Ch.1, MOS Ch.1
Process and Threads	zyBook Ch.2, MOS Ch.2.1-2.2,6.1
Introduction to Linux	
Scheduling	zyBook Ch.3, MOS Ch.2.4
Concurrency	zyBook Ch.4, MOS Ch.2.3, 2.5
Memory Management	zyBook Ch.6, MOS Ch.3.1-3.3, 3.7
Virtual Memory	zyBook Ch.7, MOS Ch.3.3-3.5
File Systems	zyBook Ch.8, MOS Ch.4.1-4.3
Input/Output	zyBook Ch.9, MOS Ch.5.1-5.4, 4.4
Deadlock	zyBook Ch.5, MOS Ch.6.2, 6.4-6.6
Security	zyBook Ch.10, MOS Ch.9

## GRADING PROCEDURES

Zybook activities	10%
Canvas quizzes	20%
Participation	5%
Individual assignments	40%
Group project	25%

Generally, A corresponds to excellent performance, B to good, C to fair, and F to failure to understand the basics.

### Late Policy

Deadlines are an unavoidable part of being a professional and this course is no exception. Course requirements must be completed and posted or submitted on or before specified due date and delivery time deadline. Due dates and delivery time deadlines are defined as Eastern Time (as used in Hoboken, NJ). Please note, students living in distance time zones or overseas must comply with this course time and time and due date deadline policy. Avoid any inclination to procrastinate. To encourage you to stay on schedule, due dates have been established for each assignment and the project. **Late submissions without pre-approval will not be graded.**

### Course Project

TBA

## ACADEMIC INTEGRITY

### Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at <http://web.stevens.edu/honor/>.

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

“I pledge my honor that I have abided by the Stevens Honor System.”

### Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at [www.stevens.edu/honor](http://www.stevens.edu/honor).

### **Cheating**

**Students caught cheating (for example, plagiarizing code or answers from another student or the Internet) will receive 0 points in the corresponding assignment/quiz/etc.**

## QUIZ CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Room Conditions on the quiz or exam.

1. Students may use the following materials during quizzes and exams. Any materials that are not mentioned in the list below are not permitted.

Material	Permitted?	
	Yes	No
Handwritten Notes		X
Typed Notes		X
Textbooks		X
Readings		X

2. Students **are not** allowed to work with or communicate with other students during quizzes.

## LEARNING ACCOMMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. Student Counseling and Disability Services works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, and psychiatric disorders in order to help students achieve their academic and personal potential. They facilitate equal access to

the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from SCDS staff. The SCDS staff will facilitate the provision of accommodations on a case-by-case basis. These academic accommodations are provided at no cost to the student.

## Disability Services Confidentiality Policy

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit <https://www.stevens.edu/office-disability-services>. If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at [pgehman@stevens.edu](mailto:pgehman@stevens.edu) or by phone 201-216-3748.

## INCLUSIVITY

### Name and Pronoun Usage

As this course includes group work and class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

### Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

## MENTAL HEALTH RESOURCES

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression). CAPS is open daily from 9:00 am – 5:00 pm M-F. Evening hours are available by appointment in the Fall / Spring semesters and up-to-date information regarding the availability of evening appointments can be found by visiting [www.stevens.edu/CAPS](http://www.stevens.edu/CAPS) (Links to an external site.). To schedule an appointment, call 201-216-5177.

Due to the pandemic, in-person appointments may be limited until further notice. Up-to-date information about the availability of in-person services can be found at [www.stevens.edu/CAPS](http://www.stevens.edu/CAPS) (Links to an external site.). Teletherapy (therapy via secure video platform) is available to registered students physically located in the states of New York or New Jersey. Students located outside of NY / NJ are encouraged to pursue local treatment through their personal health insurance. To learn more about the process of finding a therapist please visit the CAPS webpage on Seeking Help Off-Campus (Links to an external site.).

## EMERGENCY INFORMATION

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text “Home” to 741-741). If you are concerned about the wellbeing of another Stevens student, and the matter is not urgent or time sensitive, please email the CARE Team at [care@stevens.edu](mailto:care@stevens.edu). A member of the CARE Team will respond to your concern as soon as possible.