Course Syllabus

Welcome! This Syllabus for CS444, Operating Systems 2, describes the materials, objectives, and the course policies that I expect us all to adhere to. For everything else, please refer to our course Home Page. It is required that you understand and know the information contained both on this Syllabus and on our Canvas site.

Instructor

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The course dates are listed on Canvas.

Communications

Our Canvas site contains the office hours and contact information for myself and all TAs. We will also have an Ed Discussion forum for posting long-form Q&A, and a Teams channel for instant communication. I strongly recommend that you use these two methods as your primary method of getting help from the teacher and TAs. You can always email the teacher and TAs, but it will always be slower.

Our goal is to answer emails within 1 business day. Note that the teacher and TAs don’t generally work on weekends or holidays.

Subject Matter

Operating Systems 2 explores the internals of operating systems including virtualization, concurrency, and persistence. We also study the principles of computer operating systems like concurrent processes, synchronization, memory management, job scheduling, multiprocessing, file systems, performance evaluation, and networking.

You will be using Linux, C, assembly, and git extensively in this course.

Our Student Learning Outcomes are:

1. Design, implement, and test operating system functions within a large and open source code base.
2. Select appropriately among processes, user threads, or kernel threads to solve a concurrency problem.
3. Explain why synchronization is necessary for a concurrent process scenario, and design and implement synchronization solutions.
4. Apply appropriate algorithms to avoid deadlock for a given group of concurrent processes.
5. Explain the strengths and weaknesses of several CPU scheduling algorithms with respect to wait time, turnaround time, throughput, and context-switching implementation challenges.
6. Explain various mechanisms for protection of memory, the operating system, and system/user files.
7. Map virtual addresses to physical addresses.
8. Analyze program data access patterns that may impact the performance of a virtual memory system.
9. Explain various disk block allocation/free-space management strategies, and compute access time for various disk scheduling algorithms.

**Course Materials**

The course material is presented via a set of Modules in Canvas.

Books discussed on Canvas are all optional and are mostly free.

**Assignments**

There are 4 programming assignments in this course, presented as Labs.

Our main approach will be to build our own operating system. The course material will prepare you for 4 different labs which are the only 4 graded components of the course. The labs ask you to build out and finish JOS, an educational OS project. You'll start by getting it boot (Lab 1), adding virtual memory (Lab 2), setting up process management (Lab 3), and finally adding multi-tasking (Lab 4).

I highly recommend that you start the Modules when they become available. They will take time to accomplish, but I promise they're interesting!

In terms of OSU systems, you must use only our class server, as described on Canvas, to test your programs and Assignments for this course. You may of course use your own computer to do development work on, but everything must compile and be runnable on the course server to earn points. Do not use other OSU servers to run our class assignments on, as much of our software will crash the server; this is why we have been given our own machine! If you fail to heed this requirement, running our software on a non-class server will hurt your grade!

**Tests**

There is no midterm or final exam in this course. There is a Syllabus Quiz due soon after the course begins, though, so don’t miss it!

**Grading**

All of the assignments will be using grading scripts provided to you. To assign grades to your submissions, the graders will be following a set of grading instructions that are simply to run the same script you have, which automatically adds up your score. Note that the graders may run additional tests not communicated beforehand to verify that your program is adhering to the specifications, though nothing will be added to the specification. For example, if a grader suspects that a submitted program has been written in such a way that it passes a listed grading test, but does not adhere to the specification, then an additional test is likely to be run. However, any additional test done shall be easily justified as checking that the program adheres to the specification. The amount of points to be awarded or taken away by these additional tests is at the discretion of the grader.
Any crashes, hangs, errors, infinite loops, etc. not covered in the grading instructions and/or grading scripts will cause your program to lose points. The amount lost depends on the severity, how much it affects the rest of the program, and how it is recovered from, if at all, all based on the discretion of the grader.

If you have grading questions about the homework, you must contact your grading TA directly, as they do ALL of the grading. You can see the contact information for our TAs on our Home Page.

We do not use any sort of proctoring for any assignment or test in this class.

All assignments must be submitted as specified in Canvas, according to the posted due date and time, or they will be subject to penalties. All assignments that are submitted late by less than 24 hours will have 10% deducted from their grade (e.g. your program submitted at 12:01pm, if it was due at 12:00pm, will be worth 90% of its graded value). Assignments submitted late equal to or more than 24 hours, but less than 48 hours, will have 25% deducted from their grade. Assignments may not be submitted late past 48 hours, and will be worth 0 points.

You can request a regrade on an assignment by contacting your grading TA directly within 48 hours of receiving your grade. Include what points were taken off and why you feel your assignment/project does in fact meet the requirements you were penalized for: you must include screenshots of your program meeting the requirements as proof.

The Syllabus Quiz and the Final assignment cannot be submitted late.

If you have a major event in your life that will prevent you from timely completing your work, you should notify your grading TA (listed on our Home Page) ASAP. Extensions of these kinds are generally reserved for issues you can't control, such as medical reasons, OSU sports participation, student club leadership activities, or family emergencies.

There won't be a curve applied to the grading of this course, nor is there any rounding or weighting of assignments. The points you see in the grading scripts are the points you get, and evaluate to the grades in the table below. The grading scale will be adhered to strictly (I have already taken into account some pretty generous rounding):

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\begin{align*}
91.5 & \leq A \leq 100 \\
89.5 & \leq A- < 91.5 \\
87.5 & \leq B+ < 89.5 \\
81.5 & \leq B < 87.5 \\
79.5 & \leq B- < 81.5 \\
77.5 & \leq C+ < 79.5 \\
71.5 & \leq C < 77.5 \\
69.5 & \leq C- < 71.5 \\
67.5 & \leq D+ < 69.5 \\
61.5 & \leq D < 67.5 \\
59.5 & \leq D- < 61.5 \\
0 & \leq F < 59.5
\end{align*}
\]

Our goal is to return assignments back to you, graded, within 5 days of the due date.
Technical Assistance

If you experience any errors or problems while utilizing Canvas, contact the 24/7 support resources (available via the Help link that’s located within Canvas). If you experience computer difficulties, need help downloading a browser or plug-in, or need assistance logging into a course, contact the IS Service Desk for assistance. You can call (541) 737-8787 or visit the IS Service Desk online.

Statement Regarding Religious Accommodation

Oregon State University is required to provide reasonable accommodations for employee and student sincerely held religious beliefs. It is incumbent on the student making the request to make the faculty member aware of the request as soon as possible prior to the need for the accommodation. See the Religious Accommodation Process for Students.

Expectations for Student Conduct

Student conduct is governed by the university’s policies, as explained in the Student Conduct Code (https://beav.es/codeofconduct). Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Academic Integrity

Integrity is a character-driven commitment to honesty, doing what is right, and guiding others to do what is right. Oregon State University students and faculty have a responsibility to act with integrity in all of our educational work, and that integrity enables this community of learners to interact in the spirit of trust, honesty, and fairness across the globe.

Academic misconduct, or violations of academic integrity, can fall into seven broad areas, including but not limited to: cheating; plagiarism; falsification; assisting; tampering; multiple submissions of work; and unauthorized recording and use.

It is important that you understand what student actions are defined as academic misconduct at Oregon State University. The OSU Libraries offer a tutorial on academic misconduct, and you can also refer to the OSU Student Code of Conduct and the Office of Student Conduct and Community Standard’s website for more information. More importantly, if you are unsure if something will violate our academic integrity policy, ask your professors, GTAs, academic advisors, or academic integrity officers.

Students are allowed to share ideas, troubleshoot snippets of code, and collaborate while studying. However, I do require that your code submissions and test answers be YOUR OWN WORK; do not complete any assignment as a group project.

You may not turn in work that has a substantial amount of someone else's program code, except for template code that we provide to you. If you do submit such work
anyway, your submission will be reported to the College of Engineering for disciplinary action, and a preliminary 0 grade will be entered in for that assignment. The assignment grade will be finalized only when the College makes its ruling (which might not be for a few months).

We will automatically compare what you turn in against all other submissions, including this term, previous terms, other sections, and from online sources. Do not seek out previous submissions on GitHub (or other sources), even if you’re only looking for inspiration.

To be clear: do not download someone else's code, change it, and then submit it, even if you cite what you are doing. This is not acceptable and your submission will be reported to the College of Engineering for academic dishonesty.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Reach Out for Success

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it’s important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at oregonstate.edu/ReachOut. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255).

Student Evaluation of Courses

During Fall, Winter, and Spring term the online Student Evaluation of Teaching system opens to students the Wednesday of week 8 and closes the Sunday before Finals Week. Students receive notification, instructions and the link through their ONID. They may also log into the system via Online Services. Course evaluation results are extremely important and used to help improve courses and the hybrid learning experience for future students. Responses are anonymous (unless a student chooses to “sign” their comments, agreeing to relinquish anonymity) and unavailable to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.