
ACO350: Systems Programming
Fall 2023 Course Syllabus
Section #94228

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Description

Introduces operating systems as resource managers, processes, threads, memory allocation, file systems, protection, system calls, application program interfaces.

This course examines the main issues in the design and implementation of an operating system. It starts with an overview of what an operating system is, then it will cover the design and implementation of its core components, which include process and thread management, memory management and virtual memory, file system, and I/O. It also introduces key operating system concepts, such as semaphore, caching, synchronization, virtual memory, deadlock, interrupt, etc.

Prerequisites: ACO 201 *Data Structures and Algorithms*

Important Notes

- Check your ASU email and the Canvas course site daily for important class communications.
- Attend class and be an active learner! Ask questions!
- Per the ASU catalog, a 3-credit course represents a minimum of 135 hours of work for the semester. Since the class meets only 2.5 hours a week, that means you are supposed to put in approximately 7.5 hours weekly outside of class for reading, studying, practicing, and completing assignments.
- I reserve the right to change the syllabus and this grading system as the course progresses and various circumstances develop.

Learning Outcomes

- Understand key properties of the main operating system components, such as CPU scheduling, process management, memory management, file systems, disk management and I/O systems
- Have a clear understanding of the services provided by an operating system and how its different components work collaboratively to support these services
- Understand how to use command line interfaces in Linux and be able to use multiple commands (individually or in scripts)
- Be able to create programs that use multiple processes and inter-process communication features
- Be able to design and create multi-threading programs

Required Textbooks and Material

- **Operating System Concepts, 10th Edition**
Author: Silberschatz, Gagne, Galvin
Publisher: Wiley
Print ISBN: 9781119800361
- You can purchase either the Interactive eText or a hard copy of the textbook.

Course Recording

Our aim is to create a learning environment where all feel free to contribute; thus any recording of class sessions is prohibited (with the exception of those who have a DRC-approved accommodation, or the express consent of the instructor). No one should post any verbatim accounts of class discussion or say anything that could identify a class member on social media without the express permission of the class member.

Disclaimer

All provisions in this syllabus are subject to revision by the instructor. Such revisions, if any, will be announced in class and/or announced via email. The student is responsible for making note of all such announcements concerning syllabus revisions and assignments, and, in the case of lack of online participation, and/or absence or tardiness, to contact the instructor to determine if any such announcements, revisions, or assignments were made.

Instructor

Eric Eckert

Computer Science Faculty Associate, New College of Interdisciplinary Arts & Sciences

Email: eric.eckert@asu.edu

Office Hours:

- Tuesday and Thursday: ~6:30 am - 8:30 am in CLCC128 (ACO Computer Lab)
- Or by appointment

Course/Instructor Evaluation

The course/instructor evaluation for this course will be typically be conducted online 7-10 days before the last official day of classes of each semester or summer session. Your response(s) to the course/instructor are anonymous and will not be returned to your instructor until after grades have been submitted. The use of a course/instructor evaluation is an important process that allows our college to (1) help faculty improve their instruction, (2) help administrators evaluate instructional quality, (3) ensure high standards of teaching, and (4) ultimately improve instruction and student learning over time. Completion of the evaluation is not required for you to pass this class and will not affect your grade, but your cooperation and participation in this process is critical. About two weeks before the class finishes, watch for an e-mail with "NCIAS Course/Instructor Evaluation" in the subject heading. The email will be sent to your official ASU e-mail address.

Potentially Offensive Content

If you find any of the content of this class offensive, please bring your concerns to the instructor immediately. If raising the issue with the instructor is problematic, these concerns should be brought to the attention of the Director and Associate Director of the School of Mathematical and Natural Sciences.

Assessments

Please be aware that student scores on exams or other graded work may be used for assessment of program goals of degrees offered by the School of Mathematical and Natural Sciences.

Assignments and Assessment (subject to change)

Your course grade in ACO350 will be based on the distribution below. Each item is elaborated upon in the following sections.

- Homework from the book 20%
- Programming Projects 50%
- Exams 30%

Homework from the Book: Each chapter shall have several problems assigned from the book. These will be primarily non-programming assignments and are selected to ensure a comprehensive understanding of the material. This work is to be typed into the word processor of your choice and submitted online.

Programming Assignments: Individual programming assignments will be given throughout the semester. It is very important that the work you submit for the individual projects is your own work entirely. You must work alone on these assignment – no collaboration of any kind is permitted. If you are struggling with one of the Programming assignments, then you should go to instructor for help. Do not use any outside material or sources for these projects. Do not use Google or Stack Overflow or Chegg or any other search engine or online resource to look up anything. Do not copy or paste anything from anywhere. Do not get help from other students, friends, family members, roommates, online, etc. All necessary material and sources will be provided during classes and labs for this course. Any violation of these policies, or the University's Academic Integrity Policy, will result in a grade of E in the course and a report will be sent to the Dean's office - see the Academic Misconduct policies.

Exams: There will be two exams (including the final exam) given during the semester. The exams are comprehensive but will focus on the material since the last exam. Exams may consist of multiple choice, fill-in-the-blank, short answer, programming problems, or any combination thereof.

Missed Assignments

The assignments must be submitted on or before the due date and time. **No late assignments will be accepted.** If you need to miss an assignment, you must have a legitimate university approved excuse, such as a severe injury, illness, participation in a legal proceeding that require your presence, excused absences related to religious observances/practices that are in accord with ACD 304–04, excused absences related to university sanctioned events/activities that are in accord with ACD 304–02. You must contact the instructor and provide satisfactory evidence prior or within two days after the absence.

Programming assignments must be submitted electronically to the assignment submission Canvas site. Assignments are posted in Canvas under the Module in which they are assigned and are also listed under the Syllabus link. Please do not submit assignments through any other means, for example, email or printed copy unless an explicit exception is provided by the instructor.

Failing to submit three or more assignments by the required due date during the course semester may result in a withdrawal from the course.

Any code submitted for assessment must execute to receive partial credit. Code that contains syntax errors (and therefore, does not run) will receive a grade of 0. Code that compiles but does not run will also receive a grade of 0. Work incrementally so that your code will produce results to get partial credit.

Any work submitted for assessment must be your own work. Submitting the work of others, including that found on the internet, will be assigned a grade of 0 and reported per ASU Academic Integrity Policy. NEVER share your work electronically with others.

Resubmission

The students in this class are learning to program and are bound to make errors as they learn to solve problems logically and translate those solutions to Java. To support this learning process, programs that fail to achieve a perfect grade may be resubmitted one time.

The following conditions and rules apply:

- Each programming assignment is eligible for resubmission. Written assignments, quizzes and tests are not eligible.
- The original program must be submitted on time. If the program is not submitted on time, it will receive a 0, and no resubmission is possible.
- The original program must be an honest attempt to solve the problem. A submission that has just a few lines of code meant to “buy more time” will not be honored and no resubmission will be allowed. Determination of this is based solely on the judgement of the instructor.
- A student may update and resubmit their program any number of times *before* the due date. This is not considered a resubmission.
- The last submission *before* the due date will be graded once the due date has passed. If a student fails to receive a perfect score, he/she may correct the defects and resubmit the assignment on Canvas.
- The most recent resubmission will be regraded and the new score will replace the old score. Note that it is possible that the score could go down. You will receive the score of the resubmission, not the higher of the two scores.
- The due date for a resubmission is exactly 7 days (to the minute) from when the grades for the assignment are posted. For example, let’s assume that a program is due by at Friday midnight and the student turns in the program on Thursday at 5 pm. Let’s also assume that

the grades for this assignment are posted the following Tuesday a 2:30 pm. The student has until 2:30 one week later to get a resubmission in.

- Resubmissions will not be accepted for programs due the final week of class.

Grading Appeals

Any discrepancy or disagreement in grading must be presented to the instructor within a week of your receipt of your graded materials; otherwise, no grade change will be made.

Final Grade Determination

The following scale will be used to determine your final grade:

Final Grade	Percentage
A+	$\geq 98\%$
A	$\geq 90\%$ and $< 98\%$
B+	$\geq 88\%$ and $< 90\%$
B	$\geq 80\%$ and $< 88\%$
C+	≥ 78 and $< 80\%$
C	$\geq 70\%$ and $< 78\%$
D	$\geq 60\%$ and $< 70\%$
E	< 60

Withdrawals

Specifically, students should be aware that non-attendance will **NOT** automatically result in their being dropped from the course. Therefore, if a student does not attend class during the first week or for any extended period of time during the semester, they should not presume that they are no longer registered. **It is the student's responsibility to be aware of their registration status.**

Final Exam Make-up Policy

The final exam schedule listed in the Schedule of Classes will be strictly followed. Exceptions to the schedule and requests for make-up examinations can be granted only by the Associate Director of the School of Mathematical and Natural Sciences for one of the following reasons: 1) religious conflict; 2) the student has more than three exams scheduled on the same day; 3) two finals are scheduled to occur at the same time. Make-up exams will NOT be given for reasons of non-refundable airline tickets, vacation plans, work schedules, weddings, family reunions, or other such activities. Students should consult the final exam schedule before making end-of-semester travel plans.

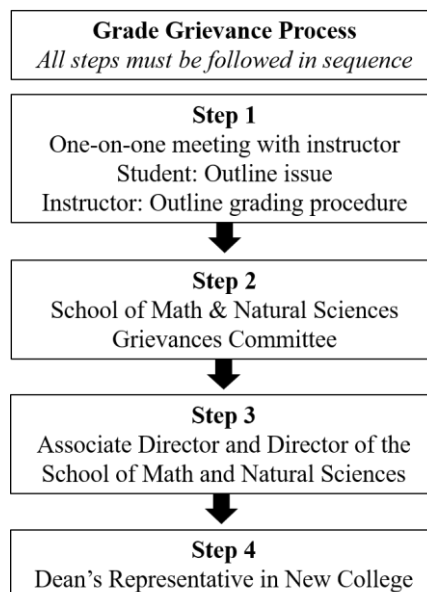
If there is a last-minute personal or medical emergency, the student may receive a grade of Incomplete and makeup the final within one calendar month. The student must provide written documentation and be passing the class at the time to receive an incomplete. A signed "Request for Grade of Incomplete" must be submitted by the student and approved by the student's instructor and the Associate Director of the School of Mathematical and Natural Sciences.

A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents a student who is doing acceptable work from completing a small percentage of the course requirements at the end of the semester. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed. A signed “Request for Grade of Incomplete” (<https://students.asu.edu/forms/incomplete-grade-request>) must be submitted by the student and approved by the student’s instructor and the Associate Director of the School of Mathematical and Natural Sciences. **A grade of incomplete will NOT be awarded unless there is documented evidence of extreme personal or immediate family hardship.** Changes in work hours, child-care emergencies, or other similar personal problems will not be approved as reasons for awarding incompletes. The Associate Director of the School of Mathematical and Natural Sciences must approve any incomplete grade requests.

Grade Grievances

The following steps must be followed by any student seeking to appeal a grade. This process does not address academic integrity allegations or faculty misconduct. Student grade appeals must be processed in the regular semester immediately following the issuance of the grade in dispute (by commencement for Fall or Spring semesters), regardless of whether the student is enrolled at the University. There are two stages to the grievance process: the informal process and the formal process. Each process contains a series of steps which must be followed in order. The informal process, outlined below and facilitated by the School of Mathematical and Natural Sciences, must be followed prior to escalation to the formal process:

1. A one-on-one meeting must be scheduled with the instructor. During this meeting, a student must state the reason for questioning that the grade was not given properly/in good faith. The instructor must review the matter, explain the grading procedure, and explain how the grade was determined. The student and the instructor must work toward resolution and grade grievances should ideally be resolved at this level.
2. If the issue is not resolved, the student can appeal to the School of Math and Natural Sciences Grievances committee (MNSgrievances@asu.edu). The student must provide a written rationale and evidence that the grade was not given properly as well as a summary of the instructor’s response/the meeting with the instructor.
3. If the issue is not resolved by MNS Grievances, the student can appeal to the Associate Director and Director of the School of Math and Natural Sciences.
4. If the issue is not resolved at the level of the School of Math and Natural Sciences, the student can confer with the Dean’s Representative in the New College of Interdisciplinary Arts and Sciences (Executive Director of Academic Services and Strategic Initiatives) who will review the case and explain the formal process to the student.



Attendance/Absence Policies

In addition to the instructor's general policy on absences and missed work, excused absences and conditions for making up work include "Accommodation of Religious Practices" (<https://www.asu.edu/aad/manuals/acd/acd304-04.html>) and "Missed Classes Due to University-Sanctioned Activities" (<https://www.asu.edu/aad/manuals/acd/acd304-02.html>). Students must notify their instructors of these absences as early as possible in the semester.

Community of Care Guideline

ASU's response to COVID-19 and for the preservation and protection of every community member's health will continue to be dynamically adjusted to keep our community healthy and well. As the information on status, current risk, and appropriate response continues to evolve, please consult the following website for the latest guidance and information: <https://eoss.asu.edu/health/announcements/coronavirus>

Academic Integrity

Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. Students in this class must adhere to ASU's academic integrity policy, which can be found at <https://provost.asu.edu/academic-integrity/policy>. Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. All academic integrity violations will be reported to the New College Academic Integrity Office (AIO). The possible sanctions include, but are not limited to: appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification, and dismissal. The AIO maintains records of all violations and has access to academic integrity violations committed in all other ASU college/schools.

ASU Student Code of Conduct

<https://eoss.asu.edu/dos/srr/codeofconduct>: Students are expected to follow the student code of conduct, especially when communicating with your peers and instructors. Violations of the student code of conduct may result in withdrawal from the class.

Assessments

Please be aware that student scores on exams or other graded work may be used for assessment of program goals of degrees offered by the School of Mathematical and Natural Sciences.

Copyright Infringement

All course content and materials, including lectures (Zoom recorded lectures included), are copyrighted materials and students may not share outside the class, upload to online websites not approved by the instructor, sell, or distribute course content or notes taken during the

conduct of the course (see ACD 304–06, “Commercial Note Taking Services” and ABOR Policy 5-308 F.14 for more information).

Students must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student’s original work, unless the students first comply with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.

Policy against Threatening Behavior

<http://www.asu.edu/aad/manuals/ssm/ssm104-02.html>: In the classroom and out students are required to conduct themselves in a manner that promotes an environment that is safe and conducive to learning and conducting other university-related business. All incidents and allegations of violent or threatening conduct by an ASU student will be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students. Such incidents will be dealt with in accordance with the policies and procedures described in Section 104-02 of the Student Services Manual.

Reasonable Accommodations for Students with Disabilities

Student Accessibility and Inclusive Learning Services (SAILS) provides information and services to students with any documented disability who are attending ASU West. Individualized program strategies and recommendations are available for each student as well as current information regarding community resources. Students also may have access to specialized equipment and supportive services and should contact the instructor for accommodations that are necessary for course completion.

Respectful Communications

As a beacon for critical thought and the advancement of knowledge, ASU values dissenting opinions. Acknowledging that someone else’s opinion matters as much as our own is the first step to creating a respectful dialogue. However, we must also distinguish between opinion, fact, and policy. Valuing and respecting those opinions that are different from our own does not mandate acquiescence or violation of policy. We expect all communications, written, email, verbal, and otherwise to be conducted with a respectful tone and tenor, and in compliance with established protocols and the ASU Code of Conduct. (<https://eoss.asu.edu/dos/srr/codeofconduct>)

Title IX

Is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>

As mandated reporters, faculty are obligated to report any information of which they become aware regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling>, is available if you wish discuss any concerns confidentially and privately.

Harassment and Sexual Discrimination

Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>.

As an employee of the University I am considered a mandated reporter and therefore obligated to report any information regarding alleged acts of sexual discrimination that I am informed of or have a reasonable basis to believe occurred.

ASU Counseling Services, <https://eoss.asu.edu/counseling>, is available if you wish to discuss any concerns confidentially and privately.

Emergencies

Emergencies/Campus Power Outage

In the event of a campus power outage or other event affecting the ability of the University to deliver classes, any decision to cancel classes will be announced using the ASU emergency notification system. For this reason, it is imperative that students register with the ASU emergency notification system at: <https://cfo.asu.edu/emergency-alert>. In cases in which a limited number of buildings are affected, students should check the university website and/or call the School office at (602) 543-6050.

Evacuation Plan

Students should be aware of the evacuation route posted on the exit door of each classroom. Students who cannot walk down stairs should notify the instructor as early in the course as possible so the instructor can provide information regarding the location of the designated

meeting area on each upper floor of the building (marked with a blue sign that states Emergency Evacuation Response Area).