

# CSc 345 (Analysis of Discrete Structures) Syllabus

## Fall 2024

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### General Catalog Information:

**Description:** Introduction to and analysis of algorithms and characteristics of discrete structures. Course topics include algorithm analysis techniques, recurrence relations, structural induction, hierarchical structures, graphs, hashing, and sorting.

**Lecture:** Tuesdays and Thursdays, 3:30 - 4:45 p.m., CESL 102

**Enrollment Requirement(s):** Computer Science Advanced Standing. CSc 210 and CSc 244.

In particular, you are expected to know the Java programming language; to be able to design, code, and debug programs consisting of hundreds of lines of object-oriented code; to understand and use basic common algorithms (e.g., sorting) and data structures (e.g., stacks); and to understand and apply basics of discrete mathematics, including the interpretation and creation of formal proofs.

**Credits:** 3

**Final Exam:** Wednesday, December 18, 2024, 3:30 p.m. - 5:30 p.m. The final is required, is comprehensive, and will be given on this date at this time. Make your travel plans accordingly.

### Class Personnel:

	<i>Name</i>	<i>Office</i>	<i>Email (@arizona.edu)</i>	<i>Phone</i>	<i>Office Hours</i>
<b>Instructor</b>	<a href="#">Prof. Lester I. McCann</a>	G-S 819	mccann	621-3498	See Piazza
<b>Grad TA</b>	Rubin Yang	TBD	yuchan0401	----	... or D2L
<b>UGTA</b>	Lucas Almeida	TBD	ldalmeida	----	... for the OHs
<b>UGTA</b>	Hamad Ayaz	TBD	hamadayaz	----	... schedule!
<b>UGTA</b>	Sohan Bhakta	TBD	sohanrbhakta	----	"
<b>UGTA</b>	CJ Chen	TBD	schen9	----	"
<b>UGTA</b>	Hyungji Kim	TBD	hyungjikim	----	"
<b>UGTA</b>	Hamlet Taraz	TBD	hamlet	----	"

Each of the TAs has successfully completed this class (or its equivalent) and is compensated by the Department of Computer Science to help me help you learn the material. They grade assignments, do the bulk of grading on the exams, let me know what topics seem to be especially baffling to the students, answer questions on Piazza, and hold office hours. I expect that you'll find the TA group to be a valuable resource.

We will each offer in-person office hours. The schedule will be announced as soon as we can create it. Please keep in mind that it is possible to meet with each of us outside of office hours, too. Contact us to make an appointment.

Information Resources:

**D2L:** [CSC 345 FA24 001](#) All class materials will be available from this D2L page, but most of it is hosted on the class web site (see next link).

**Homepage:** <http://www2.cs.arizona.edu/classes/cs345/fall24/> When you follow a link from D2L, odds are that the link will take you here.

**Textbooks:** [CS3 Data Structures & Algorithms](#) (OpenDSA Project) is the 'modern' version of the free on-line text that we'll be using for reference this semester.

[Data Structures and Algorithm Analysis](#) (PDF), by Clifford Shaffer, 2013, is the older PDF version.

**Class** We will be using [Piazza](#) for outside-of-class questions, discussions and announcements.

**Discussions:** [Click here to access the CSc 345 Piazza Q&A board](#).  
Not already enrolled in this class in Piazza? [Click here to signup](#).

**CS Helpdesk:** Need help with your lectura account, computers in the G-S 930 lab, etc.? Visit the [Computer Science Lab Helpdesk](#) for FAQs and the ability to submit a help ticket.

Course Goal, Objectives and Expected Learning Outcomes:

- **Course Goal:** Students will learn about data structures, algorithms, and algorithm design and analysis techniques beyond those covered in CSc 120, 210, and 244.
- **Course Objectives:** Students will:
  - 1. Learn more complex data structures and algorithms than those covered in CSc 120, 210, and 244.
  - 2. Be able to select appropriate data structures and/or algorithms to solve specific problems, and explain the advantages and disadvantages of the choices as compared to alternative solutions, and
  - 3. Construct implementations of those data structures and algorithms in the the programming language used in the course.
- **Learning Outcomes:**
  - 1. Asymptotically analyze iterative and recursive algorithms
  - 2. Construct and compare hierarchical structures and graphs
  - 3. Identify, analyze, and compare common searching and sorting algorithms

Topic Outline and Schedule:

- **Topic Outline:** Be advised that this is just an outline. It does not list every topic to be covered in the class. Reliance upon it is not a good substitute for attending lectures.

Un-prefixed section numbers are in the free OpenDSA CS3 text. Numbers prefixed with "(S)" reference Shaffer's "Data Structures and Algorithm Analysis" text (also free). "Lecture" means that the topic will be augmented with non-text coverage.

<i>Topics and Subtopics</i>	<i>Sections In Text</i>	<i>Sample Learning Objectives</i>
1. Review		
a. Basic Data Structures	5, (S)4.1-4.3 Lecture	• Review Lists, Stacks, and Queues • Describe n-D Array Storage Considerations

b. Mathematics and Proofs	3, (S)2	<ul style="list-style-type: none"> <li>• Know summation, sequence, and logarithmic identities</li> <li>• Identify and follow the logic of fundamental varieties of proof</li> <li>• Construct complete proofs of conjectures</li> </ul>
2. Algorithm Analysis		
a. Step-Counting and Code Profiling	Lecture	<ul style="list-style-type: none"> <li>• Identify which algorithm components are most responsible for efficiency</li> <li>• Use a code profiler to identify inefficient code</li> </ul>
b. Asymptotic Analysis	4, (S)3	<ul style="list-style-type: none"> <li>• Know and apply Big-O and related concepts</li> <li>• Perform asymptotic analysis of algorithms</li> </ul>
c. Recurrence Relations	3.6, (S)14.2, Lecture	<ul style="list-style-type: none"> <li>• Demonstrate ability to solve recurrence relations</li> <li>• Know and apply the Master Theorem</li> </ul>
3. Graphs		
a. Representations	14.1, (S)11.1-11.2	<ul style="list-style-type: none"> <li>• Compare and contrast adjacency lists and matrices</li> </ul>
b. Graph Algorithms	14.3, (S)11.3-11.4, Lecture 14.5, 14.8 14.6 14.4	<ul style="list-style-type: none"> <li>• Perform and implement BFS and DFS traversals</li> <li>• Describe and apply SSSP and APSP algorithms</li> <li>• Construct MCSTs</li> <li>• Construct a topological sort</li> </ul>
4. Internal Sorting		
a. In-memory-only Sorting	8, (S)7	<ul style="list-style-type: none"> <li>• Demonstrate mastery of common algorithms</li> <li>• Identify algorithm strengths and weaknesses</li> </ul>
5. External Sorting		
a. Larger-than-memory Sorting	9.6, (S)8.5, Lecture	<ul style="list-style-type: none"> <li>• Use external sorting to solve large data arrangement problems</li> </ul>
6. Linear Searching & Hashing		
a. Linear Searching	(S)9.1, Lecture	<ul style="list-style-type: none"> <li>• Compare searching ordered and unordered sequences</li> </ul>
b. Skiplists	15.1	<ul style="list-style-type: none"> <li>• Produce probabilistically logarithmic search time from LLs</li> </ul>
c. Internal Hashing	10, (S)9.4	<ul style="list-style-type: none"> <li>• Describe the characteristics of a good hash function</li> <li>• Describe efficient implementations of hash tables and operations</li> </ul>
7. Search Trees		
a. Review of Binary Search Trees	7.11, (S)5.1-5.4	<ul style="list-style-type: none"> <li>• Summarize basic properties and operations of BST</li> <li>• Compare and contrast implementation options</li> </ul>
b. AVL and Splay Trees	(S)13.2, Lecture	<ul style="list-style-type: none"> <li>• Distinguish these structures from BSTs</li> </ul>

		<ul style="list-style-type: none"> <li>• Show understanding of basic operations</li> <li>• Demonstrate ability to create efficient implementations</li> </ul>
c. Optimal Binary Search Trees	Lecture	<ul style="list-style-type: none"> <li>• Describe Optimal BSTs</li> </ul>
8. Beyond Binary Search Trees		
a. 2-3, 2-3-4, 2-3-4-...-n Trees	12.5, 12.6, Lecture	<ul style="list-style-type: none"> <li>• Contrast these trees with BSTs and their kin</li> <li>• Understand extension to B-trees</li> <li>• Decide when to use trees or hashing for searching</li> </ul>
b. Binary Heaps	7.17, (S)5.5	<ul style="list-style-type: none"> <li>• Know operations and preferred implementation</li> </ul>
	8.12, Lecture	<ul style="list-style-type: none"> <li>• Apply heaps to sorting</li> </ul>
9. Algorithm Families		
a. Backtracking, Approximation, etc.	(S)14.2, (S)16.1, Lecture	<ul style="list-style-type: none"> <li>• Categorize algorithms by family of common solution algorithm</li> </ul>
10. P, NP, and Undecidability		
a. P vs. NP	(S)17.2, Lecture	<ul style="list-style-type: none"> <li>• Define P, NP, NP-Hard, and NP-Complete</li> <li>• Name algorithms from each category</li> </ul>
b. Undecidable Problems	(S)17.3, Lecture	<ul style="list-style-type: none"> <li>• Distinguish solvable and unsolvable problems</li> </ul>
11. Finite State Machines & Regular Expressions		
a. Languages	Lecture	<ul style="list-style-type: none"> <li>• Define languages using regular expressions</li> </ul>
b. Finite Automata	Lecture	<ul style="list-style-type: none"> <li>• Define FSMs</li> <li>• Represent FAs with transition diagrams</li> </ul>

Topics may be added, removed, or reordered as time and circumstances dictate.

- **Topic Schedule:** The University requires that all syllabi include an expected schedule of topics and class events (e.g., exams). Please be aware that any number of unforeseen circumstances can cause a schedule to change. Thus, you should not rely on this schedule alone. It is your responsibility to pay attention to, and adhere to, changes announced in class, by email, and/or via the discussion board.

Week	Date	Class #	Scheduled Topics	Assigned Today	Due Today
1	8/27	1	Syllabus, 1	---	---
	8/29	2	1	Homework #1	---
2	9/03	3	1	---	---
	9/05	4	2	Program #1	Homework #1
3	9/10	5	2	---	---
	9/12	6	2	---	---
4	9/17	7	2	---	---
	9/19	8	3	Homework #2	Program #1
5	9/24	9	3	---	---
	9/26	10	3	Program #2	Homework #2
6	10/01	11	3	---	---
	10/03	12	3	---	---
7	10/08	13	4	---	---
	10/10	14	Exam #1	---	---
8	10/15	15	4	---	---
	10/17	16	4	Program #3	Program #2
9	10/22	17	5	---	---

	10/24	18	6	---	---
10	10/29	19	6	---	---
	10/31	20	6	Homework #3	Program #3
11	11/05	21	7	---	---
	11/07	22	7	Program #4	Homework #3
12	11/12	23	7	---	---
	11/14	24	7	---	---
13	11/19	25	8	---	---
	11/21	26	Exam #2	---	---
14	11/26	27	8	Homework #4	Program #4
	11/28	---	No Class (Thanksgiving)	---	---
15	12/03	28	9	---	---
	12/05	29	9	---	Homework #4
16	12/10	30	10, 11	---	---
Final	12/18	---	Final Exam (Wed 3:30pm)	---	---

We will stick to the exam dates if at all possible. The rest of the dates are less firm, but we'll try to stick to them, too.

### Academic Dishonesty (i.e., Cheating):

- SEE ALSO:
- The Department of Computer Science Course Policy on Collaboration: <http://www2.cs.arizona.edu/policies/collaboration.html>
  - The University of Arizona Code of Academic Integrity: <https://deanofstudents.arizona.edu/policies/code-academic-integrity>
  - The Arizona Board of Regents list of Prohibited Conduct: <https://public.powerdms.com/ABOR/documents/1491965>
  - The Arizona Board of Regents Student Code of Conduct: <https://public.powerdms.com/ABOR/documents/1491970> (in particular, see part F, "Prohibited Conduct")
  - University Libraries' "Avoid Plagiarism" Page: <https://lib.arizona.edu/research/write-cite/plagiarism>

Most, if not all, assignments in this class will be individual assignments, to be worked on outside of class. *All individual work assigned to you in this class is to be completed only by you.* It is not acceptable for you to `borrow' (a.k.a. steal, copy, coerce, etc.) solutions or parts of solutions from other entities (people, books, web sites, artificial intelligences, etc.) or have other entities create part or all of your solutions for you. Yes, acquiring answers and solutions via the Internet is a violation of academic dishonesty! However, it **IS** acceptable (and encouraged!) for students to help one another understand the assignment requirements and other high-level issues. In short, do your own work, but feel free to discuss conceptual difficulties with each other. Of course, you may always ask me or a TA for help, but don't expect that we'll just hand you solutions; we'll make you work for them. Doing is learning!

The class policy on cheating is simple: If we determine by a preponderance of the evidence that a student or students violated one or more of the policies of academic conduct governing this class, at minimum **all** complicit students will receive no points for the academic activity or activities in question. Additional sanctions are possible depending on the circumstances of the offense(s) and the policies of the department, university, and Arizona Board of Regents, up to and including expulsion from the university. Academic integrity infractions are reported to both the Dean of Students and the Dean of the College of Science. If you have a history of violations, the penalty is likely to be much worse than just a zero on an assignment. *Multiple violations in this class will result in a recommendation of a failing course grade, at minimum.* We take academic dishonesty very seriously, as you should be able to tell; we expect you to take it just as seriously.

**Please** take the time to read the references linked above. Ignorance of the policies is not an acceptable excuse for their violation. For your convenience, here is the section of the University's Code of Academic Integrity entitled "Prohibited Conduct":

Conduct prohibited by this Code consists of all forms of academic dishonesty, including, but not limited to: 1. Cheating, fabrication, facilitating academic dishonesty, and plagiarism as set out and defined in the Student Code of Conduct, ABOR Policy 5-308-E.11, and F.1. 2. Submitting an item of academic work that has previously been submitted or simultaneously submitted without fair citation of the original work or authorization by the faculty member supervising the work. 3. Violating required disciplinary and professional ethics rules contained or referenced in the student handbooks (hardcopy or online) of undergraduate or graduate programs, or professional colleges. 4. Violating discipline specific health, safety or ethical requirements to gain any unfair advantage in lab(s) or clinical assignments. 5. Failing to observe rules of academic integrity established by a faculty member for a particular course. 6. Attempting to commit an act prohibited by this Code. Any attempt to commit an act prohibited by these rules shall be subject to sanctions to the same extent as completed acts. 7. Assisting or attempting to assist another to violate this Code.

The bottom line: **Do your own work!** If you have any doubts, please come talk to us -- **before** you do something you might regret.

## Grades and Grading:

SEE ALSO: • UA General Catalog's Grades and the Grading System: <https://catalog.arizona.edu/policy/courses-credit/grading/grading-system>

• Family Educations Rights and Privacy Act (FERPA): <https://www.registrar.arizona.edu/privacy-ferpa/ferpa>

- **Assignment Weighting:** Details for each component can be found in the following subsections.

Homeworks (4)	= 20 % total
Programs (4)	= 24 % total
Quizzes (best 5)	= 10 % total
Midterm Exams (2)	= 30 % total
Comprehensive Final Exam	= 16 %
Total	= 100 %

By department policy, the final exam is *required*.

I use the common 90-80-70-60 grading scale. It's possible (though unlikely) that final grade cutoffs will be lowered a little (from 89.5% to 88.5% for the bottom of the 'A' range, for example) but they will never be raised. I make such determinations only at the end of the term, after the final exam has been graded.

- **Class Attendance:**

SEE ALSO: • UA General Catalog's Class Attendance Policies: <https://catalog.arizona.edu/policy/courses-credit/courses/class-attendance-participation>

• Dean of Students Attendance and Absences page: <https://deanofstudents.arizona.edu/policies/attendance-policies-and-practices>

We do not take (and so do not grade you on) attendance during lectures. That said, we strongly recommend that you attend all of the lectures. Experiencing, and contributing to, in-person lectures greatly improves learning. Please be aware that there is no guarantee of due-date extensions or any other accommodations when you are absent from class and/or miss a deadline. This includes students who enroll in the class after the first day of class. Please contact me to discuss your situation. Absences pre-approved by the UA Dean of Students (or dean's designee) will be honored.

If you feel sick, or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel. Notify your instructor(s) if you will be missing up to one week of

course meetings and/or assignment deadlines. If you must miss the equivalent of more than one week of class due to a qualified emergency (the birth of a child, mental health hospitalization, domestic violence matter, house fire, hospitalization for physical health (concussion/emergency surgery/coma/COVID-19 complications/ICU), death of immediate family, Title IX matters, etc.), the Dean of Students is the proper office to contact.

- **Late Enrollment:**

If you enroll in the class after the first graded activity has been assigned, please see the instructor to discuss possible adjustments to due dates.

- **Administrative Drops:**

Every semester, students enroll in CS classes but do not submit any work, resulting in a grade of 'E' at the end of the term. To prevent this, after the end of the second week, I will be administratively dropping all students who have not submitted any activities collected prior to the no-W drop date.

- **Homeworks and Programs:**

The idea behind the homework and program assignments is to help you get more hands-on experience with the material as preparation for the exams. The more practice you get, and the more you 'step back' and examine the context of the exercises as you do them, the more you will benefit.

- *Quantity and Frequency:*

I plan to assign four programs and four homeworks. You will have two or three weeks for the programs, but just one week for the homeworks.

- *Facilities:*

The Department of Computer Science labs in Gould-Simpson 228 and 930 will be available for your use for the programming assignments. Java 1.8 is installed. Many students find it convenient to work on the assignments at home; I expect that all of the software we use in this class will be accessible from an off-campus networked computer. If you do decide to use a system outside of our department's control for your work, it's your responsibility to learn how to set it up and use it effectively.

If you do your work on non-departmental machines, you will have to transfer your solutions to `lectura.cs.arizona.edu` for submission. Installing an SFTP client program (e.g., WinSCP) on your computer will help facilitate such file transfers. In the case of program submissions, expect us to compile and run your programs from lectura's Linux command line using Oracle's JDK to verify their completeness and correctness. It is your responsibility to ensure that your programs run completely and correctly on a department Linux machine before you submit them. (Why are we so particular? Simple -- we can automate some if not all of the execution of test cases this way, which makes grading easier and more consistent. With classes of this size, permitting a great deal of variability is impractical.)

- *Assignment Submissions:*

In this class, we expect to receive electronic submissions of **all** assignments, including written homeworks.

- *Homeworks*

You may use a word processor (such as Microsoft Word or OpenOffice Writer), a document formatting package (such as LaTeX 2/e), or even (as a last resort, please!) a scanner to digitize handwritten answers. **Regardless of the tool used, we expect you to submit documents in Portable Document Format (PDF) form.** The key justification for insisting on electronic submissions is to ensure that each assignment has a reliable timestamp, so that everyone is clear on whether or not an assignment is late. We anticipate using the venerable 'turnin' utility on lectura for all submissions.

Homeworks will be submitted to Gradescope. We expect your written work to have your answers clearly marked, to include sufficient detail to enable us to follow your reasoning, and to be legible so that we can easily read your words, understand your explanations, and decipher your diagrams. Difficulties in any of these areas will likely result in a loss of points. This isn't high school; you are preparing yourselves for careers, and you need to get in the habit of preparing your work in a professional manner. Here's another way to look at it: Make it easy for us to see that you know your stuff.

- *Programs*

For programs, my usual code documentation and style guidelines are available from the class web page. Documenting code is not the most enjoyable activity you'll ever experience, but it is important to do, and to do well. Program documentation/style is worth 25-30% of your score on a program. Also, expect us to compile and run your programs on *lectura* to verify their completeness. Be certain that your program runs correctly on a department Linux machine (preferably *lectura*) before you submit it.

- *Late Assignment Policy:*

Each assignment will have a clearly stated due date and time. Typically, the time will be five minutes after the start of lecture on the due date. Electronic submissions received after that time will be considered late. Assignments submitted within the first 24 hour period after the due date and time are considered to be one day late. Submissions received within the next 24-hour period are two days late, etc. Any day of the week, including Saturdays, Sundays, and all holidays, count as days for the purpose of determining lateness.

At the start of the term, you are granted five (5) no-penalty late days that can be used on either programs or homeworks. However, how late days may be applied differs by assignment type:

- **Homeworks:**

*No homework may be submitted more than 24 hours late and still receive any points.* Thus, you can use a maximum of one late day per homework assignment. If your late days are exhausted, a homework submitted within 24 hours after the due date will lose 20% (one day late) or 40% (two days late). After that, it is worth no points, but you may still submit it for comments from the TAs.

- **Programs:** Programs may be submitted if they are more than 24 hours late. When a program is submitted late, you will lose no points until you have exhausted your late days. When your late days have been exhausted, you will lose 20% per day the program is late. After five such deductions, your score for that program will necessarily be zero.

For example, if a program is due at 1 p.m. on the 12th but you submit your code at 1:30 p.m. on the 13th, it is considered to be two days late. If you had three late days remaining, you'd lose two of them but would still be able to earn full credit on the assignment if it works correctly and is well-structured and well-documented. If you had only one late day remaining, you'd lose it and 20% (that is, your program will be graded out of a maximum of 80%).

Final detail: No matter how many late days you have saved, no assignment will be accepted after Reading Day.

Why the difference between homeworks and programs? We anticipate providing solutions to homeworks, but not to programs. If we were as open-ended on homeworks as programs, solutions could not be provided for 10 days after due dates. By that time, the homework solutions would not be as useful.

- *Incomplete or Incorrect Assignments:*

It is up to you to decide whether to submit an incomplete assignment or to use a late day (or days, in the case of programs) in hope of completing the assignment. If you feel that you deserve an extension of the due date based on *exceptional* circumstances, contact me and I will consider your request.



Each assignment will be worth a certain number of points. We will award partial credit to incorrect and/or semi-legible submissions when appropriate. If you feel that your assignment was graded improperly, please contact the TAs to discuss your concerns.

- *Requesting Reconsideration of an Assignment Grade:*

If you feel that your grade on an assignment is incorrect, contact the TAs within one week of the time the assignment grades were returned to the class as a whole (not to you individually). Requests for a reexamination of an assignment grade sent after a week will be denied, unless extraordinary circumstances exist.

- **Quizzes:**

I am planning to give seven or eight unannounced quizzes, of which only your best five scores will be counted. Because not all of the quizzes will contribute to your total quiz score, we will not be giving make-up quizzes. If you miss a quiz, that will be one of those that is dropped. The quizzes will occur (very) roughly every two weeks, and will have questions over some or all of the material covered since the previous quiz, previous exam, or the start of the term.

The use of electronic devices (e.g., calculators) is NOT permitted on quizzes unless warranted by special circumstances.

As with assignments, we will entertain quiz grade reconsideration requests only within a week after the time the quiz was returned to the class (not to you individually).

- **Exams:**

Exam formats will be fairly consistent throughout the semester. Exams will contain short answer and problem-solving questions, but true/false, multiple choice, fill-in-the-blank, and code-writing questions are also possible. The use of calculators or any other electronic devices is NOT permitted on exams unless warranted by special circumstances.

I expect all students to take the exams at the announced exam times. I give make-up exams only in *extreme* circumstances. I decide if a circumstance is "extreme." For example, being in a documented car accident on the way to the exam is likely to count as an extreme circumstance. Circumstances that are **not** considered to be extreme include losing a cell phone, breaking up with a significant other, forgetting to set/heed an alarm clock, having the sniffles, consoling a depressed house plant, etc. Please be aware that missing a midterm exam isn't necessarily a disaster; see below.

- *Midterm Exams:*

General Information: Midterms will focus on the material covered in class and on the assignments since the time of the previous midterm (or the start of the term in the case of the first midterm). As new material in this class usually builds upon the old, you should expect that your knowledge of material covered by previous exams will be necessary for success on subsequent exams.

Grading Timetable: We will do our best to return graded midterm exams within two class meetings of the date of the exam. If grading will take more time, we will keep you informed.

Regrade Requests: After midterm exams are graded, they will be returned to you. If you feel that your exam was graded improperly, prepare a brief memo that explains which problems concern you and why. *Within one week of the date on which the exam was returned to the class*, submit the memo to me. **I will regrade the entire exam**, paying particular attention to the concerns you highlighted in the memo. Because errors in grading can cause scores to be too high as well as too low, it is possible that your grade will go down as a result of the regrade. Be sure to review your entire exam before you ask for a regrade.

- *Comprehensive Final Exam:*

SEE ALSO: • Final Exam Regulations: <https://registrar.arizona.edu/faculty-staff-resources/room-course-scheduling/schedule-classes/final-exams/final-examination>

• Final Exam Schedule: <https://registrar.arizona.edu/faculty-staff-resources/room-course-scheduling/schedule-classes/final-exams/final-exams-fall-2024>

By department policy, final exams are *required* in all undergraduate classes. By university policy, final exams must be held during the time slot assigned by the final exam schedule. I have listed that time near the beginning of this syllabus. (If you see that I have listed the exam time incorrectly, please let me know.) **The final will be comprehensive** and will have a format similar to that of the midterms. If you miss the final under less than extreme circumstances, you will receive a score of zero for the final.

At the end of the semester, I will replace your lowest midterm exam score with a percentage-equivalent copy of your final exam score, but only if the final score is higher than at least one of your midterm scores. (Thus, this is a potential bonus but never a penalty.) I do this to reward you for demonstrating an improved mastery of the material over the course of the semester. However, it can also help you if you should miss a midterm because your car broke down, your alarm clock didn't go off, moths ate your clothing, or any other non-extreme quirk of fate. Please note that should you miss multiple midterms under sub-extreme circumstances, you will definitely get a zero for those additional missed midterms.

- *Exam Seating:*

If room capacity permits, leave a seat vacant between you and your neighbor. If need be, we will reseal students before or even during an exam to maintain an honest evaluation environment for all students. Don't be surprised if you see me taking pictures of the class during the exam. That action probably doesn't mean that we think that someone is cheating; it also happens to be a convenient way to document attendance.

## Class Policies:

- **Classroom Behavior:**

SEE ALSO: • Office of Diversity and Inclusion: <http://diversity.arizona.edu/>

- *Maintain an Effective Learning Environment:* To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).
- *No Audible Alerts:* While class is in session, please disable all audible alerts on your communication devices in favor of an inaudible alert mode, or just turn the device off. If you receive a call or message that requires an immediate verbal response, kindly leave the class before replying.
- *Use of Electronic Devices During Lecture:* I ask that you limit your in-class use of electronic devices (laptop computers, tablets, cell phones, etc.) to activities that are directly relevant to the class. Such activities may include taking notes and running example programs from the class web page. Playing games, following your friends on social media, and watching TV shows, movies, and cute cat videos are all examples of activities you should not be doing in class. You're paying a lot of money to be in this class; you should pay attention and get your money's worth. Your classmates are also paying to be here; your behavior should not distract them, either. Should your activities become a distraction to me or to your classmates, I'll ask you to either stop or to leave the room until you are able to focus on the class material.
- *Asking Questions:* Is encouraged! During class, feel free to interrupt with questions whenever they occur to you. I may ask you to hold off on your question for a few moments if I'm in the middle of an explanation, but I'll come back to you. If I forget, just remind me.

- *Answering Questions:* Is also encouraged! I frequently ask questions of the class during lectures to judge the level of understanding (and to break up the monotony). Some students really like answering questions, sometimes to the point of discouraging anyone else from answering. If you are an eager answerer, pace yourself; let someone else answer an easy one once in a while, and save the hard ones for yourself.
- *Chatting with Your Classmates:* Sometimes you can't resist making a comment to your friend. I don't want you to injure yourself by trying to hold it in. Go ahead and whisper that comment. Just don't let it grow into a conversation. If what you have to say is that irresistibly juicy, write a note or hold the thought until after class. We're confident that the passage of time will not diminish its wit and hilarity. The point, of course, is to avoid distracting the instructor and/or other students.

#### ◦ **Response Time:**

The instructor and the TAs will attempt to reply to email and discussion board postings from students within 24 hours (48 hours on weekends/holidays). This means that if you wait until the evening before an assignment is due to post a question, you may not get a reply before the due date and time. There's a classic sentence that covers this: *A failure to plan on your part does not constitute an emergency on our part.* We want to help, but, like you, we have tasks other than email and discussion board postings that require our attention.

Important note: We encourage you to answer the posted questions of other students if and when you are able to do so. This is why we have a discussion board that is open to the entire class.

To help your email stand out in our inboxes, please prefix your subject lines with "CSc 345:", as in "CSc 345: My smart speaker encrypted my digital homework!". Doing this will help reduce the chance that your email is inadvertently marked as 'spam'.

#### ◦ **Extra Credit:**

*There will be no opportunities for extra credit points.* Use your time to concentrate on doing well on the assigned work. If your grade in this class is important to you, start taking this class seriously **now**, not just after you do poorly on the first exam.

#### ◦ **Missed Classes:**

SEE ALSO: • Religious Accommodation Policy <http://policy.arizona.edu/human-resources/religious-accommodation-policy>

All holidays or special events observed by organized religions will be honored for those students who show affiliation with such religions. Absences pre-approved by the UA Dean of Students office will be honored when it is reasonable to do so. No matter the reason for missing class, the student is always responsible for the missed material.

#### ◦ **Auditing:**

SEE ALSO: • Audit Policy: <https://catalog.arizona.edu/policy/registration-tuition-fees/registration-enrollment/audit>

• Change of Schedule Instructions: <https://registrar.arizona.edu/records-enrollment/enrollment/change-schedule>

If you are auditing this class, you may continue to attend lectures. You may turn in assignments if the TAs agree to accept them. You may not take exams, but I'll give you a paper copy if you ask nicely.

### University and Department Policies:

#### ◦ **CS Course Syllabus Policies and Resources:**

In addition to what follows, the CS Department has a page of [CS Course Syllabus Policies and Resources](#) that you are welcome to consult.

- **Computer Science Academic Advising:**

*SEE ALSO:*

- CS Academic Advising: <https://www.cs.arizona.edu/undergraduate/advising>
- UA Advising Resource Center: <https://advising.arizona.edu/>

If you have questions about your academic progress this semester, or your chosen degree program, consider contacting your CS academic advisor (see link above). Your academic advisor and the UA Advising Resource Center can guide you toward university resources to help you succeed. Computer Science major students are encouraged to email [advising@cs.arizona.edu](mailto:advising@cs.arizona.edu) for academic advising related questions.

- **On Dropping a Class:**

*SEE ALSO:*

- Dates and Deadlines Calendar: <https://registrar.arizona.edu/dates-and-deadlines>
- Grades & the Grading System: <https://catalog.arizona.edu/policy/courses-credit/grading/grading-system>

If you find yourself thinking about dropping this (or any other) class, first make sure that that's what you really want to do. Chatting with the instructor and your academic advisor may help. If you drop within the first two weeks of the semester, there will be no notation on your transcript; to an employer, it will be as though you'd never enrolled. During the third through the tenth weeks, a drop will be recorded on your transcript by a 'grade' of "W" ("withdrawn"). After the tenth week, dropping becomes a challenge, because you will need to provide documentation to the dean's office explaining why you were unable to drop the class during the first ten weeks of the semester.

- **Grades of 'Incomplete':**

*SEE ALSO:*

- Registrar's Incomplete (I) Grade page: <https://registrar.arizona.edu/faculty-staff-resources/grading/grading-policies/incomplete>
- Grades & the Grading System: <https://catalog.arizona.edu/policy/courses-credit/grading/grading-system>

The university's course catalog contains all of the details about incompletes, but this is the key sentence:

The grade of I may be awarded only at the end of a term, when all but a minor portion of the course work has been satisfactorily completed. The grade of I is not to be awarded in place of a failing grade or when the student is expected to repeat the course; in such a case, a grade other than I must be assigned.

The phrase "a minor portion" is accepted to mean "20% or less." To qualify for an incomplete, a student must have maintained a passing grade for the class until the term is nearly complete, and then, due to an unusual and substantiated cause beyond the student's control, the student is unable to complete the class work. In short, you can't get an "I" just because you aren't happy with your grade.

- **Accessibility and Accommodations:**

*SEE ALSO:*

- UA Disability Resource Center Information for Students: <http://drc.arizona.edu/students/overview> (520-621-3268)
- UA SALT Center: <http://www.salt.arizona.edu>

The university and the Disability Resource Center (DRC) have asked all instructors to include in class syllabi the following information about the availability of reasonable accommodations for students with disabilities:

### Accessibility and Accommodations:

At the University of Arizona we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (see above) to establish reasonable accommodations.

Please allow students with accessibility needs first chance at the accessible table(s) and chair(s) in the classroom.

Additional help is available from the UA Strategic Alternative Learning Techniques (SALT) Center. SALT provides fee-based services for students with various learning disabilities.

Under the guidelines of the Rehabilitation Act of 1973 and the Americans with Disability Act of 1990, students are obligated to notify the school that they need accommodation.

### ◦ **Helping Students in Need:**

- SEE ALSO:*
- Student Assistance Program from the Dean of Students: <https://deanofstudents.arizona.edu/support/student-assistance> (520-621-7057, DOS-deanofstudents@email.arizona.edu)
  - UA Campus Health: <https://health.arizona.edu/> (520-621-9202, after hours 520-570-7898)
  - UA Campus Health Counseling and Psych Services (CAPS): <https://caps.arizona.edu/> (24/7 hotline: 520-621-3334)
  - UA "Notice.Care.Help." Form: [https://arizona-advocate.symplicity.com/care\\_report/index.php/pid928981?](https://arizona-advocate.symplicity.com/care_report/index.php/pid928981?)
  - UA Ombuds: <https://ombuds.arizona.edu/>
  - Office of Institutional Equity: <https://equity.arizona.edu/>
  - Campus Pantry: <https://campuspantry.arizona.edu/>
  - Survivor Support Services: <https://survivorsupport.arizona.edu/> (520-621-5767)

If you know of a student (including yourself) who appears to be struggling and in need of help, of any form, the university offers a range of services. Help is available from the links above; please don't hesitate to take advantage of those resources. If you do not know where to turn, the Dean of Students office is a good place to start.

The UA Ombuds Office helps with a wide variety of issues, concerns, questions, conflicts, and challenges. The primary mission of the Ombuds Program is to assist individuals in resolving conflict, facilitating communication, and assisting the University by surfacing issues and providing feedback on emerging or systemic concerns. Communications with the Ombuds Committee are informal and off-the-record. The Ombuds Committee is governed by the following standards: (1) Confidentiality; (2) Impartiality; (3) Informality; and (4) Independence.

Please be aware that UA faculty are required to report allegations of sex discrimination to the Title IX office. This means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking that involves another student or employee, or that happens on campus or in a UA program, I must share that information with the Title IX Coordinator.

### ◦ **Department of Computer Science Code of Conduct**

- SEE ALSO:*
- Department of Computer Science Code of Conduct: <https://www.cs.arizona.edu/code-conduct>
  - The ABoR Student Code of Conduct: <https://public.powerdms.com/ABOR/documents/1491970>

The Department of Computer Science is committed to providing and maintaining a supportive educational environment for all. We strive to be welcoming and inclusive, respect privacy and confidentiality, behave respectfully and courteously, and practice intellectual honesty. Disruptive behaviors (such as physical or emotional harassment, dismissive attitudes, and abuse of department resources) will not be tolerated. The complete Code of Conduct is available on our department web site. We expect that you will adhere to this code, as well as the ABoR Student Code of Conduct, while you are a member of this class.

◦ **Safety on Campus and in the Classroom:**

- SEE ALSO:*
- In Case of Emergency: <https://cirt.arizona.edu/case-emergency/overview> (In short: Call 911!)
  - UA Police Department: <https://uapd.arizona.edu/> (Non-Emergency: 520-621-UAPD(8273))
  - UAlert: <https://cirt.arizona.edu/ualert/ualert-services>
  - Safety Preparedness Training (Active Shooter) : <https://uapd.arizona.edu/community-engagement/active-shooter-video>
  - Building Emergency Plans <https://cirt.arizona.edu/resources/building-emergency-plans>

Acts of violence at educational institutions are increasing in frequency. Should you find yourself in danger of being attacked, CIRT recommends "Run, Hide, Fight": First, try to escape. If you cannot, find a place to hide. As a last resort, fight using anything you have available as a weapon. For a list of emergency procedures for all types of incidents, please visit the CIRT link, above.

The university offers UAlert, a free service that notifies users of active incidents on or near campus. Members of the campus community are added to the system automatically. Visit the link, above, to adjust your settings.

◦ **Disruptive, Harassing, and/or Threatening Behaviors:**

- SEE ALSO:*
- UA Nondiscrimination and Anti-harassment Policy: <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>
  - UA Policy on Disruptive Behavior in an Instructional Setting: <http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting>
  - UA Policy on Threatening Behavior by Students: <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>
  - Hazing Policy of the University of Arizona: <http://policy.arizona.edu/education-and-student-affairs/university-arizona-hazing-policy>

The University of Arizona is committed to creating and maintaining an environment free of discrimination. In support of this commitment, the University prohibits discrimination, including harassment and retaliation, based on a protected classification, including race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information. For more information, including how to report a concern, please see the "UA Nondiscrimination and Anti-harassment Policy" link, above.

The university takes a very dim view of antisocial behaviors. In particular, if you're upset with me or a TA, please talk directly with us, calmly and with facts at hand, about your concerns.

**Caveat:**

The information contained in this syllabus, other than the grade and absence policies, are subject to change with reasonable advance notice, as deemed appropriate by the instructor. Whenever possible, changes will be announced to the class before the on-line version of this document is altered.

Return to [CSc 345 Home Page](#)

This syllabus follows the Undergraduate Course Syllabus Policy passed by the University of Arizona Faculty Senate January of 2016 and effective starting with Summer 2016 classes. The policy is available from <http://policy.arizona.edu/faculty-affairs-and-academics/course-syllabus-policy-undergraduate-template>

If you have any comments about this page, drop me a note at [mccannl@acm.org](mailto:mccannl@acm.org)