

# Syllabus

## CS 2100 - Data Structures and Algorithms 1

### — Course Description

A second course in computing with an emphasis on **foundational data structures and program analysis**. The course provides a comprehensive look at the Java programming language including object-oriented programming, concurrency, inheritance / polymorphism. Additionally, foundational data structures and related algorithms / analysis are studied. These include Lists, Stacks, Queues, Trees, Hash Tables, and Priority Queues.

### — Covid-19: Safety and Respect

Your safety and comfort are important to us. In this course, we will diligently follow all University regulations. As you know, this may change throughout the semester. At the time of writing this document, wearing a mask is optional in classrooms. However, everybody's health risks, circumstances, and level of comfort are different. Therefore, anybody choosing to wear a mask during class is welcome to do so. We will interpret wearing a mask as being considerate and caring of others in this classroom. We may also choose to mask and remain distanced.

If you're not feeling well, please call Student Health at (434) 924-5362; for all our safety and health, please stay at home and watch the recorded lecture—whether you might think it's actually a cold or just seasonal allergies. At least one professor will record their lecture. We will ensure that staying home does not impact your grade compared to being in person, so that you can take the time you need to get better, quarantine, or isolate as needed.

### — Prerequisites

To be successful, students should have the equivalent of one semester of programming knowledge (specific language does not matter), as demonstrated by any of the following:

- Have taken CS 1110/1111/1112/1120 with a **C- or better**.
- Have credit on your transcript for an equivalent course from high school or another university.
- Passed the CS 1110 place-out exam, AP exam, IB exam, etc.

[Info on CS 1110 place-out exam: <https://engineering.virginia.edu/introduction-programming-and-place-out-tests> ]

- It must be turned in **by 3:30pm the first Friday of the semester** to be used as a prerequisite for this course. Contact the CS Office ([cs-student-support@virginia.edu](mailto:cs-student-support@virginia.edu)) for further information.

If you feel you have **not** met these prerequisites, please contact the instructors immediately.

### — Course Objectives ([ABET Course Objectives](#))

By the end of the semester, students should be able to:

- Understand how to write programs in Java, including all basic structures (e.g., if-statements, loops, functions), recursion, objects, methods, inheritance / polymorphism, and exception throwing / handling.

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- Understand and implement several key data structures, required for a foundational education in computer science. These data structures include Vectors, Linked Lists, Stacks, Queues, Binary Search Trees, AVL Trees, Hash Tables, and Priority Queues.
- Understand and implement various sorting methods, including bubble sort, insertion sort, mergesort, quicksort, and heapsort.
- Understand and analyze program analysis using practical approaches (e.g., mergesort vs. quicksort) and theoretical approaches (e.g., balanced vs. unbalanced search trees). This will include both space and time complexity analyses.
- Gather an abstract and basic understanding of concurrency and associated issues (shared resources, etc.). Students will be able to implement simple multi-threaded programs in Java.

### — Instructor Availability

It is important to us to be available to our students, and to address their concerns. If you have general questions that relate to course activities, please follow this algorithm:

1. Is it a personal question?
  - a. YES: Contact instructor via email, office hours, or appointment
  - b. NO: Go to step 2
2. Check Piazza
3. Has the question already been answered?
  - a. YES: Done
  - b. NO: Go to step 4
4. Is it a homework programming question?
  - a. YES: Is it a quick question or clarification?
    - i. YES: Post the question to Piazza!
    - ii. NO: Go to step 4b
  - b. Are you having trouble with the assignment?
    - i. YES: Talk to others in lab or go to Office Hours
    - ii. NO: Go to step 4c
  - c. Are you going to miss a deadline?
    - i. YES: see the syllabus section related to late work
    - ii. NO: Go to step 4d
  - d. All other homework questions should be emailed to ticketing system (JIRA).
5. Is it a lab related question?
  - a. YES: Talk to your Lab TAs
  - b. NO: Go to step 6
6. Is it a grade related question?
  - a. YES: Regrade requests for quizzes and programs are your first step. Then email to the ticketing system (JIRA)
  - b. NO: Go to step 7
7. Any other questions should be emailed to ticketing system (JIRA)

— **Attendance**

Attendance in labs is mandatory if you intend to pass the class (because the quizzes are taken in lab). Class attendance is encouraged, but not required. Lectures will be recorded by the instructors, but sometimes there are technical issues, and the recordings are not available. We will try and make the time you spend in class with us a good investment of your time.

— **Professionalism**

In this course, being kind, respectful, supportive, compassionate, and mindful of others is essential. Unprofessional behavior, such as misbehavior towards instructors/classmates/TAs, disrupting class, not following University COVID-19 regulations, consistently missing assignment deadlines, misuse of class platforms (e.g., Piazza), or causing distractions for other students, can and will be held against a student when final grades are calculated (up to **20% course grade penalty**).

— **Special Circumstances / SDAC**

The University of Virginia strives to provide accessibility to all students. It is our goal in this course to create a learning experience that is as accessible as possible. If you anticipate any issues related to the format, materials, or requirements of this course, please meet with us outside of class so we can explore potential options. Students with disabilities may also wish to work with the **Student Disability Access Center (SDAC)** to discuss a range of options to removing barriers in this course, including official accommodations. We are fortunate to have an **SDAC advisor, Courtney MacMasters**, physically located in Engineering. You may email her at [cmacmasters@virginia.edu](mailto:cmacmasters@virginia.edu) to schedule an appointment. For general questions please visit the [SDAC website](https://sdac.studenthealth.virginia.edu): [sdac.studenthealth.virginia.edu](https://sdac.studenthealth.virginia.edu). If you have already been approved for accommodations through SDAC, please send me your accommodation letter and meet with me so we can develop an implementation plan together.

— **Religious Accommodations**

It is the University's long-standing policy and practice to reasonably accommodate students so that they do not experience an adverse academic consequence when sincerely held religious beliefs or observances conflict with academic requirements.

Students who wish to request academic accommodation for a religious observance should submit their request to me by email as far in advance as possible. Students who have questions or concerns about academic accommodations for religious observance or religious beliefs may contact the [University's Office for Equal Opportunity and Civil Rights](#) (EOCR) at [UVAEOCR@virginia.edu](mailto:UVAEOCR@virginia.edu) or 434-924-3200.

— **Safe Environment**

The University of Virginia is dedicated to providing a safe and equitable learning environment for all students. If you or someone you know has been affected by power-based personal violence, more information can be found on the [UVA Sexual Violence website](#) that describes reporting options and resources available - [www.virginia.edu/sexualviolence](http://www.virginia.edu/sexualviolence).

The same resources and options for individuals who experience sexual misconduct are available for discrimination, harassment, and retaliation. [UVA prohibits discrimination and harassment](#) based on age, color, disability, family medical or genetic information, gender identity or expression, marital status,

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military status, national or ethnic origin, political affiliation, pregnancy (including childbirth and related conditions), race, religion, sex, sexual orientation, or veteran status. [UVA policy](#) also prohibits retaliation for reporting such behavior.

If you witness or are aware of someone who has experienced prohibited conduct, you are encouraged to submit a report to [Just Report It](#) ([justreportit.virginia.edu](http://justreportit.virginia.edu)) or [contact EOCR](#), the office of Equal Opportunity and Civil Rights.

If you would prefer to disclose such conduct to a confidential resource where what you share is not reported to the University, you can turn to [Counseling & Psychological Services \(“CAPS”\)](#) and [Women’s Center Counseling Staff and Confidential Advocates](#) (for students of all genders).

As your professor and as a person, know that I care about you and your well-being and stand ready to provide support and resources as I can. As a faculty member, I am a responsible employee, which means that I am required by University policy and by federal law to report certain kinds of conduct that you report to me to the University's Title IX Coordinator. The Title IX Coordinator's job is to ensure that the reporting student receives the resources and support that they need, while also determining whether further action is necessary to ensure survivor safety and the safety of the University community.

### — Support for Your Career Development

Engaging in your career development is an important part of your student experience. For example, presenting at a research conference, attending an interview for a job or internship, or participating in an extern/shadowing experience are not only necessary steps on your path but are also invaluable lessons in and of themselves. I wish to encourage and support you in activities related to your career development. To that end, please notify me by email as far in advance as possible to arrange for appropriate accommodations. Note, any accommodations will not extend beyond the last day of finals for the semester.

### — Student Support Team

You have many resources available to you when you experience academic or personal stresses. In addition to your professor, the School of Engineering and Applied Science has staff members located in Thornton Hall who you can contact to help manage academic or personal challenges. Please do not wait until the end of the semester to ask for help!

## Learning

[Lisa Lampe](#), Assistant Dean for Undergraduate Affairs  
Director of Student Success (search underway)  
[Courtney MacMasters](#), Accessibility Specialist  
[Free tutoring](#) is available for most classes.

## Health and Wellbeing

[Kelly Garrett](#), Assistant Dean of Students, Student Safety and Support

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*Elizabeth Ramirez-Weaver, CAPS counselor\**

*Katie Fowler, CAPS counselor\**

\*You may schedule time with the CAPS counselors through [Student Health](https://www.studenthealth.virginia.edu/getting-started-caps) (<https://www.studenthealth.virginia.edu/getting-started-caps>). When scheduling, be sure to specify that you are an Engineering student. You are also urged to use [TimelyCare](#) for either scheduled or on-demand 24/7 mental health care.

### Community and Identity

The [Center for Diversity in Engineering](#) (CDE) is a student space dedicated to advocating for underrepresented groups in STEM. It exists to connect students with the academic, financial, health, and community resources they need to thrive both at UVA and in the world. The CDE includes an open study area, event space, and staff members on site. Through this space, we affirm and empower equitable participation toward intercultural fluency and provide the resources necessary for students to be successful during their academic journey and future careers.

#### — Well-being

If you are feeling overwhelmed, stressed, or isolated, there are many individuals here who are ready and wanting to help. The [Student Health Center](#) offers [Counseling and Psychological Services \(CAPS\)](#) and [TimelyCare](#) (24/7) for all UVA students. Call 434-243-5150 to get started and schedule an appointment. If you prefer to speak anonymously and confidentially over the phone, [Madison House](#) provides a HELP Line at any hour of any day: 434-295-8255.

If you or someone you know is struggling with gender, sexual, or domestic violence, there are many community and University of Virginia resources available. The [Office of the Dean of Students](#), [Sexual Assault Resource Agency \(SARA\)](#), [Shelter for Help in Emergency \(SHE\)](#), and [UVA Women's Center](#) are ready and eager to help. Contact the Director of **Sexual and Domestic Violence Services** at 434-982-2774.