

# CS 199-225: Honors Data Structures

## Fall 2024 Syllabus

*Updated: August 6, 2024*

### Course Description

Each semester, CS 225 offers a zero credit hour honors section that covers an advanced topic in CS related to data structures. This is the honors component to receive James Scholar or HCLA credit for CS 225. As an honors course, CS 199-225 will be much less structured than CS 225 and requires significant independent work and learning.

This semester, the course will focus on algorithms and data structures used to process sequences of characters (string data) and their use in large-scale data collections. Topics will include string search, string data structures, inexact pattern matching, and topics chosen by you. While the curriculum is heavily motivated by Big Data problems in genomics and CS, no knowledge of biology is assumed. Assignments and projects will be done primarily in C++.

### Course Goals

Target outcomes for this course include:

- Understand fundamental string algorithms for search, storage and indexing
- Experience applying data structures, algorithms, and algorithm design principles to real-world data science problems
- Justify implementation choices based on theoretical or practical considerations
- Develop a foundation for future data science projects in CS

### Course Enrollment

**If you are a James Scholar, do the following:**

1. Register for CS 225 section AH (CRN 75824).
2. Fill out the appropriate Honors Credit Learning Agreement (HCLA). Your description of additional work should state "Successful completion of CS 199-225 with a passing grade".

Note that each college runs its own independent James Scholar program, and different colleges have different deadlines for submitting HCLAs. Please see the following links for details for your respective program: [FAA](#), [AHS](#), [Social Work](#), [General Studies](#), [LAS](#), [Media](#), [Education](#), [Engineering](#), [ACES](#)

**If you are NOT a James Scholar, do the following:**

1. Register for CS 199 section 225 (CRN 40944) in addition to your regular lecture and lab sections. You will be awarded a pass-fail grade in CS 199-225, which has no effect on your GPA.

## Textbooks

There is no required textbook for this course. Listed below are some optional textbooks which may supplement this course in some way or act as useful additional resources for those interested.

**Algorithms on Strings, Trees, and Sequences: Computer Science and Computational Biology**  
by Dan Gusfield

**Introduction to Algorithms** by Thomas Cormen, Charles Leiserson, Ronald Rivest, and Clifford Stein

**Compact Data Structures: A Practical Approach** by Gonzalo Navarro

## Course content

The full topic list for the class can be found on the honors page course website. Slides will be uploaded before the day's class with annotated slides posted afterwards for those who prefer a marked down copy.

## Course Expectations

While no attendance will be taken and recordings will be made available, it is strongly encouraged that you show up to each lecture to take advantage of the synchronous lecture experience.

## Grading

CS 199-225 is a pass/fail class with your final grade based as follows. Each lecture will be accompanied by either a short one-week assignment involving a practical implementation of a recently covered topic or part of a multi-week short project broken into one-week chunks. Each assignment [each week] is worth 100 points and an assignment is considered a 'pass' if you achieve at least 80 points. **To receive honors credit for the course, you must 'pass' at least ten of the assignments for the semester.** This, in essence, gives each student one 'free pass' to miss or otherwise fail to complete an assignment. You are strongly encouraged not to intentionally use this pass, as it is meant to help students deal with emergency situations.

## Late Policy

Assignments will be released weekly immediately following the accompanying lecture and are due a week after (see Prairielearn for exact deadlines). Each assignment can be submitted up to 24 hours late for a maximum of 80% credit.

As this is a zero-credit course that should be low-stress, if you need a longer extension for any reason, you are strongly encouraged to submit a request via email to the course instructor. However please note that repeated requests will require a letter from the Dean (or equivalent).

## Commitment to Diversity, Equity, and Inclusion

As the state's premier public university, the University of Illinois at Urbana-Champaign's core mission is to serve the interests of the diverse people of the state of Illinois and beyond. The institution thus values inclusion and a pluralistic learning and research environment, one which we respect the varied perspectives and lived experiences of a diverse community and global workforce.

We support diversity of worldviews, histories, and cultural knowledge across a range of social groups including, but not limited to, race, ethnicity, gender identity, sexual orientation, abilities, economic class, age, religion, and their intersections. The Grainger College of Engineering recognizes that we are learning together in the midst of the Black Lives Matter movement, that Black, Hispanic, and Indigenous voices and contributions have largely either been excluded from, or not recognized in, science and engineering, and that both overt racism and micro-aggressions threaten the well-being of our students and our university community.

This course and its social resources like Discord and Piazza should be safe and encouraging learning environment that allows for the open exchange of ideas while also ensuring equitable opportunities and respect for all. Everyone is expected to help establish and maintain an environment where students, staff, and faculty can contribute without fear of personal ridicule, or intolerant or offensive language. If you witness or experience racism, discrimination, micro-aggressions, or other offensive behavior, you are encouraged to bring this to the attention of the course director or the course staff either directly or anonymously. You can also report these behaviors to [the Campus Belonging Office](#), [the Office of Student Conflict Resolution](#), or [CS CARES](#).

### **Students with Disabilities**

Disability Resources and Educational Services (DRES), a unit of the College of Applied Health Sciences, serves as the designated office of the University that coordinates campus-wide services for students with disabilities. DRES obtains and files disability documentation, certifies eligibility for services, and coordinates the planning and provision of auxiliary aids as well as the implementation of modifications and adjustments in academic rules, policies and procedures. Professional staff are available at DRES to provide University students with disability-related consultation and to assist them in obtaining both academic and nonacademic supports and services.

Any student with a disability who may need accommodations in this class should obtain an accommodation letter from the Disability Resources and Education Services (DRES) Office. Accommodations should be made known early in the semester and cannot be retroactively applied to assignments due before the time the accommodation was made known. For more details please refer to the university-wide academic accommodations [policy](#).

### **Mental Health**

Diminished mental health, including significant stress, mood changes, excessive worry, substance/alcohol abuse, or problems with eating and/or sleeping can interfere with optimal academic performance, social development, and emotional wellbeing. The University of Illinois offers a variety of confidential services including individual and group counseling, crisis intervention, psychiatric services, and specialized screenings at no additional cost. If you or someone you know experiences any of the above mental health concerns, it is strongly encouraged to contact or visit any of the University's resources provided below. Getting help is a smart and courageous thing to do – for yourself and for those who care about you.

Counseling Center: 217-333-3704, 610 East John Street Champaign, IL 61820

McKinley Health Center:217-333-2700, 1109 South Lincoln Avenue, Urbana, Illinois 61801

### **Academic Integrity**

This course inherits the Academic Integrity Policy of CS 225, with the 'full letter grade drop' resulting in a reduction of 100 points and an automatic zero on the assignment in question. This means that unless there are mitigating circumstances, a single violation will result in failing to pass the class. For a more detailed description of this Academic Integrity Policy, please see [CS 225's Academic Integrity Policy](#).