CS 114: Introduction to Computer Science II - Fall 2025

Number of Credits: 3

Instructor: Baruch Schieber

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Office hours: Fridays: 11:00 am – 12:30 pm. GITC 4207

Course Description: This course is an introduction to data structures and algorithms, including implementations in the Java programming language. At the conclusion of the course students will be able to solve problems using standard data structures and algorithms, and be able to bound the resources used by an algorithm.

Prerequisites: CS 113: Intro to Computer Science I

Learning Outcomes:

- The ability to write computer programs using standard data structures and algorithms.

- The ability to bound the resources used by an algorithm.

Textbook: *Data Structures & Algorithm Analysis in Java*, Edition 3.2, Clifford A. Shaffer, Dover, 2011. ISBN: 0486485811.
Free copy on author's webpage https://people.cs.vt.edu/shaffer/Book/JAVA3elatest.pdf

Additional material: https://opendsa-server.cs.vt.edu/ODSA/Books/Everything/html/

Software: This class requires you to bring your laptop. Please have java installed on your machine.

Course Materials and Communications:

We will be using the Canvas system. All class information will be posted there.

If you have a personal issue that needs my attention please see me in person or email me.

Academic Integrity:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: https://www5.njit.edu/policies/sites/policies/files/NJIT-University-Policy-on-Academic-Integrity.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.

Grading Policy:

The course grade will be based on the homework (35%), in-class quizzes (35%) and final exam (30%). The lowest three quiz scores will be dropped. The grading scale (out of 100) is: 93−100 A, 85−92 B+, 75−84 B, 66−74 C+, 56-65 C. (I reserve the right to modify the scale.) In addition, a grade of at least 20% is required for each component (homework, quizzes, and final) to pass the course.

In order to be excused from a component of the course that contributes to the final grade, you must supply documentation explaining your absence to the office of the dean of students, and they will in turn contact me.

Exception: If you feel sick on the day of the class, notify me by email before the start of class and you will be excused from the quiz on that day. If this happens more than once, you will be given an oral makeup exam.

Homework: Homework assignments are a significant part of the learning process. Please notice that this course expects students to work without artificial intelligence (AI) assistance in order to better develop their skills in this content area. As such, AI usage is not permitted throughout this course under any circumstance. Please write comments on your code to make it readable and easy to grade. In every class a random student will be asked to explain some parts of his/her homework solution to the class.

Homework will be posted at the beginning of each class, and will be due by the beginning of class the following week. The last homework will be a project that will take up to three weeks (and count three times as much as the weekly assignments). Typically, homework assignments will have a programming component and an analysis component. Submission rules (for example file upload types) will be posted on Canvas. Late assignments will lose 20% for every day or part of the day it is late. An assignment not submitted will get 0 mark.

Students can work with peers; however, individual work must to be submitted and names of collaborators mentioned at top of the paper. If you copy more than a couple of lines from any source (e.g., a person, a web site), you need to clearly mark the copied material with the source and the start and end of the copied text.

Unexplained answers will not receive credit.

Labs: Lab activities will include coding exercises to be completed during class time. Labs will be submitted at the end of class using canvas and will be graded.

Quizzes: There will be a quiz during class every week. You must have your own computer and be present in the classroom to take the quizzes.

Final Exam: There will be a final exam, at a time and location that will be announced by the registrar later in the semester.

Makeup Exam Policy: There will be no make-up quizzes during the semester. In the event the Final Exam is not taken, under rare circumstances where the student has a legitimate reason for missing the final exam, a makeup exam will be administered by the CS department.

In any case the student must notify the **Dean of Students and the Instructor** that the exam will be missed and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc., clearly stating the date AND time of the mitigating problem.

Cellular Phones: The use of cell phones is not permitted during class time. If there is an issue you must addend to, please do so outside the classroom.

Accommodation of Disabilities: Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT. If you need accommodations due to a disability, please contact OARS via email at OARS@NJIT.EDU. The office is in Kupfrian Hall Room 201. For further information please visit the OARS office website at: https://www.njit.edu/accessibility/

Please notice, if you are eligible for extra time and would like to use it in the final exam, please notify instructor and OARS at least two weeks prior to the exam so that accommodations can be made.

Student Absences for Religious Observations: NJIT is committed to supporting students observing religious holidays. Students must notify me in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence. We will do our best to provide academically reasonable accommodations, allowing students to complete missed assignments, exams, quizzes, or other coursework within the term.

Academic Calendar Notice: Please note that according to the academic calendar Friday classes meet on November 26, 2025

Course schedule (by weeks)

1. Introduction
2. Recursion
3. Math background, common functions
4. Algorithm analysis, asymptotic analysis
5. Lists, stacks, queues
6. Dictionaries
7. Binary trees, search trees
8. Priority queues, heaps
9. Sorting
10. Sorting lower bound, linear-time sorting
11. Selection
12. Dynamic programming
13. Graphs
14. Graph algorithms