



## Data Structures – CS 284

### School of Engineering & Science

Instructor:	Eduardo Bonelli
Contact Info:	Gateway South 350, ebonelli@stevens.edu, 201-216-5261
Course Web Address:	See Canvas
Prerequisite(s):	CS 115
Corequisite(s):	CS 135
Cross-listed with:	None

## COURSE DESCRIPTION

This course is an introduction to fundamental data structures in Computer Science. These data structures, and the algorithms that go with them, make up the standard toolkit for programmers regardless of language and application. We will use the Java programming language for representing both the data structures and also for developing simple programming projects that put them to use. Expect to do a significant amount of programming, as well as paper and pencil exercises.

## LEARNING OBJECTIVES

After successful completion of this course, students will be able to:

- (Abstract Data Types) Understand the importance of Abstract Data Types and Data Structures. Use UML to represent ADTs.
- (Complexity) Calculate the Big O of diverse non-recursive algorithms and use it to compare efficiency.
- (Collections) Use and understand Collection class in Java, with major emphasis on Lists, Stacks and Queues. Implement double linked lists in Java.
- (Trees) Implement Binary Search Trees, Max/Min-Heaps, Priority Queues in Java, and understand the basic concepts of self-balancing Binary Search Trees such as Red-Black and AVL trees.
- (Sets-Maps) Understand what are Sets and Maps, and more specifically implement hash tables in Java.
- (Sorting) Program basic sorting algorithms (such as Insertion, Selection, Merge and Quick) in Java using the Comparable interface.

- (Programming) Combine different classes together to implement big programming assignments in Java, including a final project that combines some of the data structures studied in class.
- (Testing) Use JUnit to create unit tests for each project.

## FORMAT AND STRUCTURE

This course is comprised of three weekly lectures and weekly recitation sessions.

## COURSE MATERIALS

Textbook(s):	Elliot B. Koffman & Paul A.T. Wolfgang, Objects, Abstraction, Data Structures and Design using Java Version 5.0, Wiley, ISBN 0-471-69264-6
Other Readings:	None.
Materials:	To be given in class.

## COURSE REQUIREMENTS

<b>Attendance</b>	Students are required to attend all classes.
<b>Homework</b>	There will be five (5) homework (programming) assignments throughout this course. Code that does not compile will not be accepted. Policy for late submissions: 2 points off for every hour past the deadline. If urgent or unusual circumstances prohibit you from submitting a homework assignment in time, please e-mail the instructor.
<b>Quizzes</b>	There will be quizzes throughout the semester. Quizzes will be graded for accuracy. If a student is absent (unexcused) on a day that a quiz is given s/he will receive an automatic 0 for that quiz.
<b>Exams</b>	There will be two exams in this course, a midterm, covering the first half of the course, and an endterm, covering the second half of the course. There will be no final exam.

## GRADING PROCEDURES

There are 100 possible points that a student can earn in this course. Percentages are listed below.

Homework	(35%)
Quizzes	(15%)
Midterm	(25%)
Endterm	(25%)

## ACADEMIC INTEGRITY

### Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at <http://web.stevens.edu/honor/>

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"I pledge my honor that I have abided by the Stevens Honor System."

**Reporting Honor System Violations.** Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at [www.stevens.edu/honor](http://www.stevens.edu/honor).

## EXAM ROOM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Room Conditions on the quiz or exam.

1. Students may use the following devices during quizzes and/or exams. Any electronic devices that are not mentioned in the list below are not permitted.

Device	Permitted?	
	Yes	No
Laptops		x
Cell Phones		x
Tablets		x
Smart Watches		x
Google Glass		x
Other (specify)		x

2. Students may use the following materials during quizzes and/or exams. Any materials that are not mentioned in the list below are not permitted.

Material	Permitted?	
	Yes	No
Handwritten Notes		x
Typed Notes Conditions: one 8*10 sheet (front and back) is permitted	x	
Textbooks		x
Readings		x

3. Students are/are *not* allowed to work with or talk to other students during quizzes and/or exams.

## LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. Student Counseling and Disability Services works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, and psychiatric disorders in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from SCDS staff. The SCDS staff will facilitate the provision of accommodations on a case-by-case basis. These academic accommodations are provided at no cost to the student.

### Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the office of Student Counseling, Psychological & Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

For more information about Disability Services and the process to receive accommodations, visit <https://www.stevens.edu/sit/counseling/disability-services>. If you have any questions please contact: Lauren Poleyeff, Psy.M., LCSW - Disability Services Coordinator and Staff Clinician in Student Counseling and Disability Services at Stevens Institute of Technology at [lpoleyef@stevens.edu](mailto:lpoleyef@stevens.edu) or by phone (201) 216-8728.

## **INCLUSIVITY STATEMENT**

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in education and innovation. Our community represents a rich variety of backgrounds, experiences, demographics and perspectives and Stevens is committed to fostering a learning environment where every individual is respected and engaged. To facilitate a dynamic and inclusive educational experience, we ask all members of the community to:

- be open to the perspectives of others
- appreciate the uniqueness of their colleagues
- take advantage of the opportunity to learn from each other
- exchange experiences, values and beliefs
- communicate in a respectful manner
- be aware of individuals who are marginalized and involve them
- keep confidential discussions private

## **TENTATIVE COURSE SCHEDULE**

See schedule in Canvas.