

# Grading

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**YEAR COURSE OFFERED:** 2014

**SEMESTER COURSE OFFERED:** Fall

**DEPARTMENT:** Computer Science

**COURSE NUMBER:** COSC2320

**SECTION NUMBER:** 14702

**NAME OF COURSE:** Data Structures

**NAME OF INSTRUCTOR:** Olin Johnson

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**The information contained in this class syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.**

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## Learning Objectives

Students will gain a good understanding of both theory and programming of fundamental data structures and algorithms. This course will provide a foundation for more advanced courses in computer science. Students will learn how data structures help solving many problems in all areas in computer science, including compilers, database systems and operating systems. Students will understand how derive a function that quantifies the efficiency of an algorithm and will be able to understand how to analytically prove a program works correctly. Finally, students will become experienced programmers in C++, understanding how to develop correct and robust code and how to test it.

## Major Assignments/Exams

This is a course that gives heavy weight to homework. Grading is as follows:

- 60%: 6 programming assignments,
- 40%: First try at final exam,
- 40%: Second try at final exam, if you choose to withdraw your first try.

## Required Reading

Malik, D.S.. *Data Structures Using C++*. Course Technology, 2nd edition, 2010.  
ISBN-13: 978-0-324-78201-1, ISBN-10: 0-324-78201-2

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900 - 924 A-	925 - 1,000 A	
800 - 824 B-	825 - 879 B	880 - 899 B+
700 - 724 C-	725 - 779 C	780 - 799 C+
600 - 624 D-	625 - 679 D	680 - 699 D+
	000 - 599 F	

## Recommended Reading

Any CS book on C++ (I recommend Stroustrup's) and discrete mathematics are helpful for additional reference. A good reference for the theory part is the following book:

Aho, J.E. Hopcroft, and J.D. Ullman. Data Structures and Algorithms. Addison/Wesley, Redwood City, California, 2nd edition, 1983.

## List of discussion/lecture topics

Topics include the following:

1. Basics of C++: pointers, arrays, parameter passing, class encapsulation, inheritance, methods, function overloading, I/O
2. Abstract Data Types (ADTs) and OOP
3. linked lists, queues,
4. stacks, recursion
5. trees, balanced trees, multi-way search trees
6. hashing functions and hash tables,
7. Sorting and search algorithms: selection sort, heap sort, quick sort, shell sort, merge sort, linear and binary search, hash-based search.
8. graphs, graph traversal, search, path problems, transitive closure

Theory covered in the course:

1. time complexity analysis
2. algorithm design techniques
3. recursive functions
4. proving algorithm correctness