



**Subject: CSCI Number: 262**

**Course Title: Data Structures**

**Sections: A,B,R01-R03**

**Semester/year: Spring 2018**

**Instructor/Coordinator:** Christopher Painter-Wakefield

**Contact information:**

**office:** Brown Building (BB) 280I

**phone:** 303-273-3717

**email:** cpainter@mines.edu

**Office hours:**

Tuesdays and Thursday 1 - 3pm

or by appointment, or whenever my office door is open

**Instructor:** Alex Anderson

**Contact information:**

**email:** aleander@mines.edu

**Office hours:**

Tuesdays 9:30 – 10:30 am and Wednesdays 9:30 – 11:00 am, location TBD

**Class meeting days/times/locations:**

Section A: MW 12:00-12:50 – Instructor: Alex Anderson

Section B: MW 1:00-1:50 – Instructor: Christopher Painter-Wakefield

Section R01 (lab): F 12:00-12:50 – Instructor: Alex Anderson

Section R02 (lab): F 1:00-1:50 – Instructor: Alex Anderson

Section R03 (lab): F 2:00-2:50 – Instructor: Andrew Coles

**Links:**

**Course Website:** <https://cs.mines.edu/Courses/csci262/spring2018/>

**Canvas:** <https://elearning.mines.edu/login/saml>

**Piazza:** <https://piazza.com/mines/spring2018/csci262>

**Instructional activity:**   3   hours lecture     0   hours lab     3   semester hours

**Course designation:**       Common Core       Distributed Science or Engineering  
                                X   Major requirement       Elective       Other (please describe \_\_\_\_\_)

**Course description from Bulletin:**

Defining and using data structures such as linked lists, stacks, queues, binary trees, binary heap, hash tables. Introduction to algorithm analysis, with emphasis on sorting and search routines. Language skills: abstract data types, templates and inheritance. Prerequisite: CSCI261 with a grade of C- or higher. 3 hours lecture; 3 semester hours.

**Textbook and/or other requirement materials:**

**Required text:** *Programming in C++ and Data Structures* (available from the school bookstore, or at <https://learn.zybooks.com> with code MINESCSCI262PainterWakefieldFall2017

**Student learning outcomes: At the conclusion of the class students will be able to:**

1. Evaluate and understand the trade-offs in selecting one data structure vs. another, and employ data structures in the solution of realistic problems.
2. Understand the purpose of an abstract data type (ADT) such as a list or map. Recognize that ADTs can have different implementations.
3. Implement fundamental data structures including linked structures, stacks, queues, hash tables, and trees.
4. Implement recursive subroutines to search and manipulate data structures.
5. Determine computational complexity of simple functions, including asymptotic analysis of upper and average complexity bounds, big O notation, standard complexity classes, and empirical measurements of performance.
6. Understand the behavior and computational characteristics of fundamental computing algorithms including sorting algorithms, hashing, graph representation and traversal, and binary search tree operations.
7. Implement programs using object-oriented design and object-oriented programming including encapsulation and information hiding, separation of specification and implementation; classes, subclasses, and inheritance; polymorphism; class hierarchies.

**Brief list of topics covered:**

1. Abstract data types
2. Data structures, including linked structures, stacks, queues, hash tables and trees
3. Pointers and dynamic memory
4. Classes, inheritance, and polymorphism
5. Standard template library (STL)
6. Recursion
7. Searching
8. Sorting

**Grading Procedures:**

Programming assignments come in two flavors: APTs and projects. APTs consist of small, automatically graded programs or bits of code, while projects required you to program fully functional programs to accomplish some specified task. Each Friday there will be a lab activity. There will be two midterm exams and a final. Finally, a small percentage of your grade will be based on your participation in classroom activities and on Piazza.

Grading will be done on an absolute, but adjustable scale. This means that there is no curve. Anyone earning 90% or more of the total number of points available will receive a grade of A; 80% or higher a B, etc. This scale may go down, but it will not go up.

**You must pass the final (60% or higher) to pass this course.**

All grades will be posted in Canvas.

- Assignments: 40%
- Labs: 10%
- Class participation: 5%
- Midterms: 20%
- Final exam: 25%

**Late policy:** Late work is *strongly* discouraged. All work will be accepted within 4 working days after the deadline (weekend and holiday days do not count in the 4 days). Students will lose 10 percentage points per day late. After 4 days, the work will not be accepted at all.

**Coursework Return Policy:** Homeworks and exams will be graded and returned as quickly as possible, generally within two weeks.

**Absence Policy:** Please see the Mines policy on absences at <http://inside.mines.edu/Student-Absences>

**Learning Environment:** Below you can find some "official" language from Mines on similar topics, but I also want to share my own views regarding the learning environment as it relates to my course, both in and out of the classroom.

Fundamentally, I expect and require respect in this course for yourself, your classmates, and your instructor and TAs.

- Respect for yourself includes taking care of yourself physically and mentally and advocating for an environment that facilitates learning for you.
- Respect for your classmates includes recognizing and appreciating the diversity of backgrounds and experiences of your classmates and making it your interest to foster a learning environment for everyone. Some of your classmates may already be expert programmers, while others may have only just begun to learn; all are welcome.
- Respect for your instructors (as well as your classmates) includes not participating in disruptive or distracting behavior: talking, playing games, or web surfing during lecture, for instance, make it difficult for others to focus on the reason we are all here.
- Respect must be mutual to be effective; we (your instructors) and your TAs will be held to the same standards of respect.

It's important to recognize that the rigorous requirements of studying at Mines can cause stress, which sometimes results in distressed or disruptive behavior. If you are experiencing issues, or believe that one of your partners or teammates is, please SPEAK UP. Feel free to come talk to your instructor, or visit <http://studentlife.mines.edu/Student-Life-Care>. For serious violations of school policies, also see <http://speakup.mines.edu/>.

**Discrimination and Harassment:** This course and all learning opportunities at Mines require a safe environment for everyone to be productive, develop professional practices, and to be able to share and learn without fear of discrimination or harassment. Discrimination or harassment of any type will not be tolerated. Sometimes harassment is unintentional, but regardless of intent the instructor will address any language or behaviors that might discriminate, stereotype, or promote harassment. If you witness discrimination or harassment of others, please bring it to the attention of Mines faculty so it can be addressed immediately.

Title IX is a federal law that protects individuals from discrimination based on sex and gender in educational programs or activities. Mines takes its Title IX obligations seriously and is committed to providing a campus community free from gender-based discrimination. Gender-based discrimination, including sexual harassment, sexual violence, stalking, and domestic violence, is prohibited within the Mines campus community. If these issues have impacted you or someone you know, you can find appropriate resources here: <http://inside.mines.edu/POGO-Title-IX>. You can also contact the Mines Title IX Coordinator, Karin Ranta-Curran, at 303.384.2558 or [krcurran@mines.edu](mailto:krcurran@mines.edu) for more information.

**Disability Accommodations:** The Colorado School of Mines is committed to ensuring the full participation of all students in its programs, including students with disabilities. If you are registered with Disability Support Services (DSS) and I (your instructor) have received your letter of accommodations, please contact me at your earliest convenience so we can discuss your needs in this course. For questions or other inquiries regarding disabilities, I encourage you to visit <http://disabilities.mines.edu> for more information.

**Policy on academic integrity/misconduct:** The Colorado School of Mines affirms the principle that all individuals associated with the Mines academic community have a responsibility for establishing, maintaining an fostering an understanding and appreciation for academic integrity. In broad terms, this implies protecting the environment of mutual trust within which scholarly exchange occurs, supporting the ability of the faculty to fairly and effectively evaluate every student's academic achievements, and giving credence to the university's educational mission, its scholarly objectives and the substance of the degrees it awards. The protection of academic integrity requires there to be clear and consistent standards, as well as confrontation and sanctions when individuals violate those standards. The Colorado School of Mines desires an environment free of any and all forms of academic misconduct and expects students to act with integrity at all times.

Academic misconduct is the intentional act of fraud, in which an individual seeks to claim credit for the work and efforts of another without authorization, or uses unauthorized materials or fabricated information in any academic exercise. Student Academic Misconduct arises when a student violates the principle of academic integrity. Such behavior erodes mutual trust, distorts the fair evaluation of academic achievements, violates the ethical code of behavior upon which education and scholarship rest, and undermines the credibility of the university. Because of the serious institutional and individual ramifications, student misconduct arising from violations of academic integrity is not tolerated at Mines. If a student is found to have engaged in such misconduct sanctions such as change of a grade, loss of institutional privileges, or academic suspension or dismissal may be imposed.

The complete policy is [online](#).

#### **Collaboration Policy for Programming Projects in CS Courses:**

The following policy exists for all CS courses. This policy is a minimum standard; your instructor may decide to augment this policy.

1. If the project is an individual effort project, you are not allowed to give code you have developed to another student or use code provided by another student. If the project is a group project, you are only allowed to share code with your group members.
2. You are encouraged to discuss programming projects with other students in the class, as long as the following rules are followed:
  - a. You view another student's code only for the purpose of offering/receiving debugging assistance. Students can only give advice on what problems to look for; they cannot debug your code for you. All changes to your code must be made by you.
  - b. Your discussion is subject to the empty hands policy, which means you leave the discussion without any record [electronic, mechanical or otherwise] of the discussion.
3. Any material from any outside source such as books, projects, and in particular, from the Web, should be properly referenced and should only be used if specifically allowed for the assignment.

All issues of misconduct are reported to the Dean of Students.

#### **Instructor's Addendum:**

As an addendum to this policy, you are required to submit a README file with every (non-autograded) assignment. The README should list every person (other than the instructor or a TA) who assisted you in

some way on the assignment. The README is also the place to give appropriate credit to any outside source that contributed to your submission.