
Land Acknowledgement

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

Course Information

Instructor Details

Robert Collier
robert.collier@scs.carleton.ca

Course Website

"Merge COMP2402A : COMP2402B"
<https://brightspace.carleton.ca/d2l/home>

Please use the email address above for questions of a personal or confidential nature.

All other questions must instead be posted to the official discussion forums (on Brightspace).

Lecture Hours

COMP 2402 A

Tuesday / Thursday[†]
11:35 – 12:55

COMP 2402 B

Tuesday / Thursday[†]
08:35 – 09:55

[†]Starting the week of January 13, Thursday lectures will be conducted Online via Zoom.

Check Carleton Central for the locations for the in-person lectures and tutorial sessions.

Once available, the Teaching Assistant Office Hours schedule will be posted to Brightspace.

Office Hours with the instructor are held online via Zoom and are available by appointment.

Calendar Description

"Introduction to the design and implementation of abstract data types and to complexity analysis of data structures. Topics include: stacks, queues, lists, trees and graphs. Special attention is given to abstraction, interface specification and hierarchical design using an object-oriented programming language."

Precludes: Additional credit for SYSC 2100.

Prerequisite(s): (COMP 1006 or COMP 1406 or SYSC 2004) with a minimum grade of C-.

Topics Covered

If a student attends every lecture and completes every assignment and tutorial, then by the end of this course that student should be able to:

- use the Java Collections Framework
- contrast the fundamental collection interfaces (i.e., lists, stacks, queues, and dequeues)
- implement different abstract data types using both arrays and linked-lists
- describe performance considerations for different abstract data type implementations
- apply (and provide formal analyses of) the following techniques:
 - stacks, queues, deques, linked lists, skiplists
 - unordered sets, hash tables,
 - ordered sets, balanced binary search trees
 - priority queues, heaps, sorting algorithms

Assessment Scheme

Your performance in this course is assessed using several components. These include a collection of six (6) assignments, two (2) midterm examinations (released **February 6th** and **March 20th**), and a final examination (scheduled by the Registrar).

Final grades will be determined using the scheme detailed in the table below.

No extra credit assignments will be provided under any circumstances.

Component	Each	Weight	Details
Assignments (6)	8 %	40 %	Biweekly ; Grade Computed from the Best 5 of 6 (Iff All 6 are Completed) Refer to the Tentative Calendar for Deadlines
Midterm 1 of 2	15 %	30%	Available February 6 th and February 7 th on Brightspace
Midterm 2 of 2	15 %		Available March 20 th and March 21 st on Brightspace
Final Exam	30%	30%	To Be Determined

Laptop Requirement (School of Computer Science)

Every student that has been enrolled in a 1000-level (i.e., first year) course offered by the School of Computer Science after the 2020/2021 school year is required to have a laptop. For more information, please visit <https://carleton.ca/scs/scs-laptop-requirement/> and then review the requirements at <https://carleton.ca/scs/scs-laptop-requirement/laptop-specs/>.

Students are not required to purchase textbooks or other learning materials for this course.

Assessment Policies

Assignments are not optional components and you will upload your submissions to Brightspace. The assignment component of your final grade can be computed using only the best five of the scores you receive and, as a result, **the instructor does not grant exemptions** for the assignments under any circumstances. You are expected to work on your assignments consistently once they are released (uploading your progress at least once every 48 hours). Under extenuating circumstances, if you are seeking additional accommodations (perhaps due to an ongoing medical issue, for instance), you may petition the Associate Dean's office.

Assignment submissions are handled electronically (i.e., through Brightspace) and although they are technically due on Fridays by 11:59pm EST, submissions will also be accepted up to a "cut-off" deadline 48 hours later (i.e., on Sundays at 11:59pm EST). There is no further "grace period" beyond that, and **any assignment submitted even one minute after the "cut-off" deadline is considered "late" and will receive a mark of zero**. Any missed assignment will receive a zero, but the final grade assignment component will be computed using the best 5 of the 6 grades received **if and only if all 6 assignments are deemed satisfactory before Friday, April 4th, at 11:59pm EST**.

Technical problems do not exempt you from the requirements above, so if you wait until the last minute and then have issues with your internet connection (for instance), you will still receive a mark of zero. Consequently, it is a formal requirement of this course that you:

- periodically upload your progress (i.e., upload your progress at least once every 48 hours)
- attempt your final submission at least one hour in advance of the due date and time

Any files being submitted (i.e., assignments) must have the correct filenames and the specified format. **Assignments that are incorrectly named or in the incorrect format will be penalized** and may receive a mark of zero. Consequently, after you have uploaded your submission, you are **required to re-download it immediately and ensure that your submission was correct**.

Midterm examinations are also mandatory (i.e., not optional) and will be conducted online using Brightspace. Each of the two **midterm exams will be available during a 48-hour period**. Refer to the tentative calendar posted to Brightspace for more details. Please note that students must ensure that they only attempt midterm examinations from a location with a strong internet connection and maintain (i.e., keep fully updated) both a primary and a backup web browser.

Students with an illness on the day of a midterm or tutorial may be granted an exemption only if they fully complete the Academic Consideration for Coursework Form that is available online from <https://carleton.ca/registrar/academic-consideration-coursework-form/>. Please also note that a student **cannot, under any circumstances, be exempted from both midterm examinations** or more than one of the tutorial activities.

Plagiarism Policies

Most of the activities in this course were designed to be completed individually and without the use of any artificial intelligence-based tools. **Unless it is explicitly stated otherwise, the use of any artificial-intelligence based tools will be considered academic misconduct.** This includes, but is not limited to, chatbots (e.g., ChatGPT, Google Bard, Bing Chat), research assistants (e.g., Elicit), and image generators (e.g., Stable Diffusion, Dall-E), etc.

If you are unsure of the expectations regarding academic integrity (how to use and cite references, if collaboration with lab- or classmates is permitted (and, if so, to what degree), then you must ask your instructor. **Sharing assignment, quiz, or tutorial specifications with anyone or posting them online (to sites like Chegg, CourseHero, OneClass, etc.) is always considered academic misconduct (at any time, even after the course has concluded).**

All materials created for this course (including, but not limited to, lecture notes, in-class examples, tutorial exercises, assignments, examinations, and posted solutions) **remain the intellectual property of the instructor.** These materials are intended for the personal and non-transferable use of students registered in the current offering of the course. Reposting, reproducing, or redistributing any course materials, in part or in whole, without the written consent of the instructor, is strictly prohibited.

There is a separate plagiarism policy document for this course that can be found on the course website. **Students must read this document thoroughly and must agree to abide by this policy** (and all policies stated in this course outline) before any resources will be made available.

You are never permitted to record, post, share, or upload course materials (even for portfolio purposes) without explicit permission from your instructor. Academic integrity offences are reported to the office of the Dean of Science and details about the process and penalties for such offences can be found at: <https://science.carleton.ca/students/academic-integrity/>.

In the event that a student has been found to have committed an instructional offence, a penalty will be applied to that student's final grade. If the penalty applied by the Office of the Associate Dean is less than the total value of the activity, the remaining weight is shifted onto the weight of the final exam. Consider the following example: if the course has an assignment worth 10% and a final worth 40% and a student plagiarizes and receives a 50% deduction to his or her assignment, their final exam would be worth 45% of the final mark and the plagiarized assignment would be worth nothing. To clarify, 50% of the 10% allocated to the assignment was lost and the remaining 50% of the 10% allocated to the assignment was shifted to the final.

Students are invited to discuss any concerns with the instructor at the earliest opportunity.

Important Considerations

This is a **synchronous course** and **attendance to the lectures is mandatory**. Lecture notes will be made available on Brightspace, but these **resources should be considered supplementary** and often feature only a more cursory, higher-level overview of the corresponding lecture demonstration.

Students should **pose all questions related to the course using the official discussion boards** and must avoid emailing the instructor directly unless the question contains confidential information or is of a personal nature.

The instructor will attempt to answer every student email received within three business days of the time the message was received, unless the email requests information already posted on the official discussion boards or in the course outline. To ensure that all announcements are received, **students are expected to check their email on a daily basis**.

It is the responsibility of the student to **ensure that quiz, tutorial, and assignment marks posted to Brightspace are correct**. Students are required to **thoroughly review their marks and feedback within one week** of the date the marks were released. Concerns or complaints about the grading of must be communicated (**first to the teaching assistant**, then, if the result is unsatisfactory, to the instructor) within that one-week period after the release of the marks. After that one week, no further consideration will be offered and any student requests to correct or revise marks will not be accepted for any reason.

In addition to the time spent attending lectures and tutorials, every student should expect to spend **at least eight (8) hours per week (on average) on this course**. Students are responsible for all course materials, including lecture notes, tutorial exercises, and all materials discussed in class and on any of the official discussion boards.

Additional Notes

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP, by telephone at 520-2600, ext. 4364 or by email at undergraduate_advisor@scs.carleton.ca. The advisor can assist with information about prerequisites and preclusions, course substitutions or equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisor will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and the Writing Tutorial Services.

You are also **required to read** the information at:

<http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>

This calendar is tentative and subject to change.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 1	6	7 Introduction to Abstract Data Types	8	9 Reviewing Complexity Analysis	10	11
Week 2	13	14 Stack and List Operations with Arrays	15	16 Introduction to Amortized Analysis	17	18 Assignment 01 ← Due Friday
Week 3	20	21 Array-Backed Queues and Deques	22	23 Implementing Deque with Dual Arrays	24	25
Week 4	27	28 The "Rootish" Array Stack	29	30 Linked List Fundamentals Revisited	31	1 Assignment 02 ← Due Friday
Week 5	3	4 Space-Efficient Linked Lists	5	6 Quiz 1 of 2	7 Quiz 1 of 2	8
Week 6	10	11 The "Skiplist"	12	13 "Buffer Class" (to be determined)	14	15 Assignment 03 ← Due Friday
Week 7	17 No Classes (Reading Break)	18 No Classes (Reading Break)	19 No Classes (Reading Break)	20 No Classes (Reading Break)	21 No Classes (Reading Break)	22
Week 8	24	25 ChainedHashTable	26	27 LinearHashTable	28	1 Assignment 04 ← Due Friday
Week 9	3	4 Hash Codes and Equality	5	6 Binary Trees Binary Search Trees	7	8
Week 10	10	11 Scapegoat Trees	12	13 Treaps	14	15 Assignment 05 ← Due Friday
Week 11	17	18 2-4 Trees Red-Black Trees	19	20 Quiz 2 of 2	21 Quiz 2 of 2	22
Week 12	24	25 Heaps Heap Sort	26	27 Randomized Meldable Heaps	28	29 Assignment 06 ← Due Friday
Week 13	31	1 Graphs	2	3 Huffman Coding	4 All Missed Assignments Must Be Received	5
Week 14	7	8 "Buffer Class" (to be determined)	9	10	11	12