Course Information

Instructor Details

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Course Website

"Merge COMP3007 A:B:C Progra..."
https://brightspace.carleton.ca/d2l/home

Lecture Hours

COMP 3007 A	COMP 3007 B	COMP 3007 C
Tuesdays / Thursdays †	Tuesdays / Thursdays †	Mondays / Wednesdays †
10:05 - 11:25	13:05 - 14:25	10:05 - 11:25

† Thursday and Wednesday lectures are conducted online via Zoom unless otherwise indicated.
n.b., Teaching Assistant contact information and office hours will be posted to Brightspace.

Calendar Description

"An introduction to alternative programming paradigms such as functional, constraint-based, concurrent, and logic programming."

Prerequisite Courses: COMP 1805 (with a minimum grade of C-), COMP 2401 (with a minimum grade of C-) COMP 2402, (COMP 2404 or SYSC 3010 or SYSC 3110), and (COMP 2406 or SYSC 4504)

Required Textbook

One (1) required textbook: **Lipovaca, M. (2011). Learn You a Haskell for Great Good!**
(n.b., this textbook is available to read for free at http://learnyouahaskell.com/chapters)

Two (2) optional, recommended textbooks: **Clocksin, W. (1994). Programming in Prolog**
Thompson, S. (2011). Haskell: the Craft of Functional Programming

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

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:

- describe and contrast the different programming paradigms
- use structural induction to prove (rather than test) the correctness of a program
- use Haskell for writing programs in the functional programming paradigm
- use Prolog for writing programs in the logical programming paradigm
- explain equational reasoning, lazy evaluation, referential transparency
- demonstrate primitive recursion, general recursion, and tail-call optimization techniques
- demonstrate pattern matching and the use first-class objects and higher-order functions

Assessment Scheme

Academic performance in this course is assessed using several components, including eight (typically weekly) assignments, two midterm quizzes (released February 11th and March 18th), 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 (7*)	5%	35%	Weekly Refer to the Tentative Calendar (last page) for Deadlines
Midterm 1 of 2	20%	40%	Available February 11th and February 12th on Brightspace
Midterm 2 of 2	20%		Available March 18th and March 19th on Brightspace
Final Exam	25%	25%	To Be Determined

n.b., Missed assignments always receive a grade of zero, but this component of the grade will be computed using a "best 7 of 8" rule (i.e., dropping the lowest) if and only if a complete and satisfactory (i.e., would have received a passing grade) submission for each assignment is received by the date specified.

Assessment Policies

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

Assignment and tutorial 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 7 of the 8 grades received if and only if all assignments are received, complete, and satisfactory by Wednesday, April 8th, at 11:59pm EST.

Source code submissions that cannot be compiled and/or executed will receive a mark of zero. 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.

Assessment Policies (continued)

Technical problems do not exempt you from any of the requirements noted, 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 (at least once every 48 hours) and attempt your final submission at least one hour in advance of the due date and time.

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 (and at the end of this document) 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 notify the professor and fully complete the Academic Consideration for Coursework Form that is available online from https://carleton.ca/registrar/academic-consideration-coursework-form/. Please note that students cannot be medically exempted from an activity they have attempted, and 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 Chart), 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.

Plagiarism Policies (continued)

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 of any kind (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 slides will be available, but these resources should be considered supplementary and often feature only a cursory, higher-level overview of the corresponding lecture. 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 materials, including lecture notes, tutorial exercises, and all materials discussed in class and on any of the official discussion boards.

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 required to check the forums and their Carleton email addresses on a daily basis.

It is the responsibility of the student to ensure that quiz 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 are released. Concerns or complaints 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. 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.

Additional Notes

The Undergraduate Advisor for the School of Computer Science is available in Room 5302 HP or by email at scs.ug.advisor@cunet.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.

Students taking a COMP course can access the SCS computer labs. The lab schedule and location can be found at: https://carleton.ca/scs/tech-support/computer-laboratories/. All SCS computer lab and technical support information can be found at: https://carleton.ca/scs/tech-support/. Technical support staff may be contacted in-person or virtually, see this page for details: https://carleton.ca/scs/tech-support/contact-it-support/.

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	5 Diagnosing Evil	6 Diagnosing Evil	7 Introduction to Lambda Calculus	8 Introduction to Lambda Calculus	9	10
Week 2	12 Arithmetic in Lambda Calculus	13 Arithmetic in Lambda Calculus	14 Lambda Calculus as a Language	15 Lambda Calculus as a Language	16	17 Assignment 1 Due Friday
Week 3	19 Equational Reasoning in Haskell	20 Equational Reasoning in Haskell	21 Haskell Programs with Branching	22 Haskell Programs with Branching	23	24
Week 4	26 Haskell Programs with Repetition	27 Haskell Programs with Repetition	28 Data Structures for Collections	29 Data Structures for Collections	30	31 Assignment 2 Due Friday
Week 5	2 Pattern Matching	3 Pattern Matching	4 Primitive Recursion vs. General Recursion	5 Primitive Recursion vs. General Recursion	6	7 Assignment 3 Due Friday
Week 6	9 "Buffer Class" to be determined…	10 "Buffer Class" to be determined…	11 In-Class Quiz 1 of 2	12 In-Class Quiz 1 of 2	13	14
Week 7	16 No Classes (Reading Break)	17 No Classes (Reading Break)	18 No Classes (Reading Break)	19 No Classes (Reading Break)	20 No Classes (Reading Break)	21
Week 8	23 Correctness and Termination Proofs	24 Correctness and Termination Proofs	25 Structural Induction (Part I)	26 Structural Induction (Part I)	27	28 Assignment 4 Due Friday
Week 9	2 Structural Induction (Part II)	3 Structural Induction (Part II)	4 Recursive List Processing	5 Recursive List Processing	6	7 Assignment 5 Due Friday
Week 10	9 Variant Types and Tail-Call Optimization	10 Variant Types and Tail-Call Optimization	11 Algebraic Data Types	12 Algebraic Data Types	13	14 Assignment 6 Due Friday
Week 11	16 First-Class and Higher-Order Functions	17 First-Class and Higher-Order Functions	18 In-Class Quiz 2 of 2	19 In-Class Quiz 2 of 2	20	21
Week 12	23 Introduction to Prolog	24 Introduction to Prolog	25 Search and List Processing	26 Search and List Processing	27	28 Assignment 7 Due Friday
Week 13	30 Strategic Problem Solving	31 Strategic Problem Solving	1 The Cut Predicate	2 The Cut Predicate	3	4 Assignment 8 Due Friday
Week 14	6 "Buffer Class" to be determined…	7 "Buffer Class" to be determined…	8 All Missed Assignments Must Be Received	9	10	11