Course Information

Instructor Details

Robert Collier

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Course Website

"Merge COMP1805A : COMP1805B : COMP1805C"

https://brightspace.carleton.ca/d2l/home

Lecture Hours

COMP 1805 A	COMP 1805 B	COMP 1805 C
Tuesday / Thursday †	Wednesday / Friday †	Wednesday / Friday †
10:05 – 11:25	08:35 – 09:55	11:35 – 12:55

† Starting the week of September 9, Thursday and Friday lectures will be conducted Online via Zoom.
Check Carleton Central for the locations for the in-person lectures and tutorial sessions.
Once available, Teaching Assistant Contact Information and Office Hours will be posted to Brightspace.

This course will be supported by Peer Assisted Study Sessions (PASS).
Further information here: https://carleton.ca/csas/pass/

Calendar Description

"Introduction to discrete mathematics and discrete structures. Topics include: propositional logic, predicate calculus, set theory, complexity of algorithms, mathematical reasoning and proof techniques, recurrences, induction, finite automata and graph theory. Material is illustrated through examples from computing."

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:

- **construct arguments** and **formal proofs** using **multiple different techniques**
- **solve expressions** using **arithmetic**, **propositional** and **predicate logic**, and **set theory**
- **reason** about **problems** using **truth/membership tables**, **equivalences**, and **diagrams**
- **perform asymptotic analyses** to **describe** the **performance** of **different algorithms**
- **explain** the following topics:
  - **conjunction**, **disjunction**, **negation**, **implication**, and **biconditional** statements
  - **propositions**, **predicates**, and **existential** and **universal quantification**
  - the **inference mechanism** (as it pertains to **argument** and **reasoning**)
  - **weak** and **strong induction** (and its relationship with **recursive design**)
  - **union**, **intersection**, **functions**, **relations**, **countability**, and **universe(s) of discourse**
  - **graphs**, **graph representations**, **traversal algorithms** and **other properties**
  - **time complexity**, **asymptotic analysis**, **"big O"**, **"big Ω"**, and **"big Θ"** notations
  - **sequences**, **arithmetic** and **geometric series**, **sums**, and **sigma notation**

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/.

Assessment Scheme

Your performance in this course is assessed using several components. These include a collection of **mandatory weekly tutorials** (beginning the week of September 9th), **six (6) assignments**, **four (4) quizzes**, and a **final examination** (scheduled by the registrar). Final grades will be determined using the scheme described below, and **no extra credit assignments will be provided under any circumstances.**

Tutorials	(2.00 % each)	10%	Assignments	(best 5 of 6, 5.00% each)	25%
Quizzes	(8.75 % each)	35%	Final		30%

Tutorials are mandatory (i.e., not optional) and **attendance is recorded** at the beginning. The tutorial component of your final grade is computed using only **the best five of the scores you receive**. Unless previously arranged with the instructor, you must **attend the tutorial in which you are registered** – you will receive zero if you attend the wrong tutorial. You may not work on an assignment during the tutorial, and **anyone not working on the tutorial will be asked to leave and will receive zero**. You are **not permitted to work on the tutorial in advance**.

Assignments are mandatory (i.e., not optional) and you will upload your submissions to Brightspace. The assignment component of your final grade is 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**.

Quizzes are mandatory (i.e., not optional) and will take place **during your weekly tutorial** (refer to the tentative calendar on Brightspace for details). Each quiz will be **closed-book** and, unless otherwise specified, must be **completed without the aid of any other person or device**.

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.

Plagiarism Policy

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)**.

You are never permitted to post, share, or upload course materials (even for portfolio purposes) without receiving 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/.

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**.

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

Assignments submissions are handled electronically (i.e., through Brightspace) and although **assignments 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**.

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

Important Considerations

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 upload your submission** you are **required** to **re-download it immediately** and ensure that **your submission was the correct type of file and has the correct filename**.

It is your responsibility to ensure that your quiz, tutorial, and assignment marks posted to Brightspace are correct, and you must do so **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.**

Students with an **illness on the day of a quiz or tutorial may be granted an exemption** only if they **submit a copy of Carleton's official "Self-Declaration"** (in lieu of a medical certificate) Form, available online from https://carleton.ca/registrar/cu-files/covid-19-self-declaration-form/.

Students should **pose all questions related to the course using the official discussion boards**; **students 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**.

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**.

In addition to the time spent attending lectures and tutorials, students should expect to spend **at least eight (8) hours per week 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 — Undergraduate Academic Advisor

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 undergraduate 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/

Additional Notes — Computer Laboratories

Under normal circumstances, students from the School of Computer Science (SCS) can also access one of the designated computers labs for their courses. The lab schedule can be found at: https://carleton.ca/scs/tech-support/computer-laboratories/. Further information about the computer labs and technical support can be found at: https://carleton.ca/scs/technical-support/. Technical support is also available in room HP5161 Monday to Friday from 9:00 until 17:00 or by emailing SCS.Tech.Support@cunet.carleton.ca.

Additional Notes — University Policies

For information about Carleton's academic year, including registration and withdrawal dates, see Carleton's Academic Calendar at:

https://calendar.carleton.ca/academicyear/

Pregnancy Obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit:

https://carleton.ca/womensstudies/resources-and-links/equity-services/

Religious Obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit:

https://carleton.ca/equity/focus/discrimination-harassment/religious-spiritual-observances/

Additional Notes — University Policies

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the Paul Menton Centre website. For more information, visit:

https://carleton.ca/pmc

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support:

https://carleton.ca/sexual-violence-support

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the policy at:

https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

Student Academic Integrity Policy

Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Examples of punishable offences include: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found at:

https://science.carleton.ca/students/academic-integrity/

Additional Notes — University Policies

Plagiarism

As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science. Standard penalty guidelines can be found at:

https://carleton.ca/registrar/academic-integrity/

Unauthorized Co-operation or Collaboration

Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

Academic Accessibility

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes, including information about the Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances, are outlined on the Academic Accommodations website (students.carleton.ca/course-outline).

This calendar is tentative and subject to change.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 1	2 Statutory Holiday (No Classes)	3 Academic Orientation (No Classes)	4 Introduction to Discrete Mathematics	5 Introduction to Discrete Mathematics	6 No Classes for COMP1805	7
Week 2 Introductory Tutorial	9	10 Introduction to Propositional Logic	11 Introduction to Propositional Logic	12 Exhaustive Evaluation and Circuit Schematics	13 Exhaustive Evaluation and Circuit Schematics	14
Week 3 Tutorial 1	16	17 Logical Expression Translation	18 Logical Expression Translation	19 Demonstrating Logical Equivalence	20 Demonstrating Logical Equivalence	21 Assignment 01 ← Due Friday
Week 4 Quiz 1	23	24 Introduction to Predicate Logic	25 Introduction to Predicate Logic	26 The Inference Mechanism and Proof	27 The Inference Mechanism and Proof	28
Week 5 Tutorial 2	30	1 Arguing with Quantified Predicates	2 Arguing with Quantified Predicates	3 Formal Proof Methods	4 Formal Proof Methods	5 Assignment 02 ← Due Friday
Week 6 Quiz 2	7 Statutory Holiday (No Classes)	8 Proof by Induction	9 Proof by Induction	10 Recursion and Induction	11 Recursion and Induction	12
Week 7 Tutorial 3	14	15 Introduction to Set Theory	16 Introduction to Set Theory	17 Set Operations and Identities	18 Set Operations and Identities	19 Assignment 03 ← Due Friday
Week 8 No Tutorials	21 Reading Break (No Classes)	22 Reading Break (No Classes)	23 Reading Break (No Classes)	24 Reading Break (No Classes)	25 Reading Break (No Classes)	26
Week 9 Tutorial 4	28	29 Graphs and Graph Representation	30 Graphs and Graph Representation	31 Graph Search Algorithms	1 Graph Search Algorithms	2 Assignment 04 ← Due Friday
Week 10 Quiz 3	4	5 Planarity and Graph Colouring	6 Planarity and Graph Colouring	7 Sequences, Series, and Sums	8 Sequences, Series, and Sums	9
Week 11 Tutorial 5	11	12 Models of Computation	13 Models of Computation	14 Performance Analysis with Mathematics	15 Performance Analysis with Mathematics	16 Assignment 05 ← Due Friday
Week 12 Quiz 4	18	19 Big Oh, Big Omega, and Big Theta	20 Big Oh, Big Omega, and Big Theta	21 Introduction to Functions	22 Introduction to Functions	23
Week 13 Tutorial 6	25	26 Introduction to Relations	27 Introduction to Relations	28 Introduction to Countability	29 Introduction to Countability	30 Assignment 06 ← Due Friday
Week 14 No Tutorials	2	3 Algorithm Design Considerations	4 Algorithm Design Considerations	5 *To Be Determined…*	6 *To Be Determined…*	7