COMP1805A (Fall 2017) – "Discrete Structures I"

Course Outline

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.

Course Information

<table>
<thead>
<tr>
<th>Instructor Name</th>
<th>Robert Collier</th>
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</thead>
<tbody>
<tr>
<td>Contact Information</td>
<td><a href="mailto:robert.collier@scs.carleton.ca">robert.collier@scs.carleton.ca</a></td>
</tr>
<tr>
<td>Lecture Hours</td>
<td>Office Hours</td>
</tr>
<tr>
<td>Tuesdays and Thursdays</td>
<td>Mondays and Tuesdays</td>
</tr>
<tr>
<td>14:35 – 15:55</td>
<td>11:30 – 13:00</td>
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<tr>
<td>Minto Center, Room 2000</td>
<td>Herzberg Laboratories, Room 5326</td>
</tr>
<tr>
<td>Course Website</td>
<td>Course Forum</td>
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<tr>
<td><a href="https://www.carleton.ca/culearn/">https://www.carleton.ca/culearn/</a></td>
<td><a href="https://www.carleton.ca/culearn/">https://www.carleton.ca/culearn/</a></td>
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Recommended Textbook

There is one recommended (but not required) textbook for this course (available for free online):


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 11th), four (4) assignments, four (4) quizzes (see the tentative calendar for details), and a final examination (to be scheduled by the registrar). The grades you achieve on these components will be weighted with the following scheme.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
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</thead>
<tbody>
<tr>
<td>Tutorials (best 6 of 7 × 2.0% each)</td>
<td>12 %</td>
</tr>
<tr>
<td>Assignments (4 × 3.5% each)</td>
<td>14 %</td>
</tr>
<tr>
<td>Quizzes (4 × 6.0% each)</td>
<td>24 %</td>
</tr>
<tr>
<td>Final Examination</td>
<td>50 %</td>
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</tbody>
</table>

definition

n.b., You must achieve a Minimum Grade of C- in COMP1805 before you will be allowed to take COMP2804.

Tutorials are mandatory and you must attend the tutorial in which you are registered. While the tutorial is in progress you must be working on the tutorial. You may not work on an upcoming assignment during the tutorial, and anyone who is not working on the tutorial work will be asked to leave.

Assignments are mandatory. You will use cuLearn to submit your assignments and you must ensure that the marks posted to cuLearn are correct within two weeks of the date the assignment grade was released. Concerns or complaints about the grading must be communicated to the teaching assistant within that time – after two weeks, no changes to the posted assignment marks will be considered.

Quizzes are 50 minutes long, are closed-book, and only cover material presented since the most recent quiz. Quizzes are held during the tutorials and must be written in the section in which you are enrolled. You must ensure that the marks posted to cuLearn are correct within two weeks of the date the quiz grade was released – after two weeks, no changes to the posted assignment marks will be considered.
Learning Outcomes

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, proposition and predicate logic**, and **set theory**
- **Perform asymptotic analyses** to **describe** the **performance** of **different algorithms**
- **Explain** the following topics:
  - conjunction, disjunction, negation, implication, and existential/universal quantification
  - union, intersection, functions, relations, countability, and the universe of discourse
  - time complexity, asymptotic analysis, "Big O", "Big Ω", and "Big Θ"
  - sequences, sums, graphs, recurrence, and induction

Important Considerations

Late assignments are never accepted for any reason. Assignments submissions are handled **electronically** (i.e., through cuLearn) and there is no "grace period" with respect to a deadline - an assignment that is submitted only one minute **after the deadline is considered late** and will receive a mark of zero.

Technical problems do **not exempt you from this requirement**, so if you wait until the last minute and then have connection issues, you will still receive a mark of zero. Consequently, you are advised to:

- **periodically upload you progress** (i.e., upload partially completed submissions)
- attempt to **submit your final submission at least 30 minutes in advance** of the due date and time

For each assignment you will be submitting exactly one (1) pdf file created using either **Google Docs** or **Microsoft Office**. Archives of compressed files (e.g., "zip", "rar", "tar", etc.) or documents in another format (e.g., "doc", "docx", "rtf", "txt", etc.) will be rejected and will receive a mark of zero. Consequently, **after you upload your submission to cuLearn you must re-download it immediately** and **ensure** that:

- your submission **can be opened using Adobe Acrobat Reader** (i.e., it is not corrupt)
- your submission is complete

Students with an **illness on the day of a quiz** might be granted an exemption if and only if they provide a **Carleton University Medical Certificate** ([http://carleton.ca/registrar/wp-content/uploads/med_cert.pdf](http://carleton.ca/registrar/wp-content/uploads/med_cert.pdf)) that has been completed and signed by a physician. **No other forms will be accepted.**

Please note that a student cannot, for any reason, be exempted from more than two quizzes.

Furthermore, because assignment specifications are posted well in advance of their due dates, **illness does not excuse a student from completing an assignment.**

No provision is made for missed assignments, and no extra credit assignments will be available.
University Policies

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. Some examples of offences are: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found in the Undergraduate Calendar.

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.

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 Accommodations for Students with Disabilities
The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and 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 me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable) at http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines

Religious Obligation
Write to me 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 the Equity Services website: http://www2.carleton.ca/equity/.

Pregnancy Obligation
Write to me 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 the Equity Services website: http://www2.carleton.ca/equity/.

Medical Certificate
The following is a link to the official medical certificate accepted by Carleton University for the deferral of final examinations or assignments in undergraduate courses. To access the form, please go to http://www.carleton.ca/registrar/form.

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.
Including the time spent attending lectures and completing tutorials, students can expect to spend at least ten (10) 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.

Students are asked to pose all questions related to course content using the official discussion boards on cuLearn; students should not email 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, in the course outline, or in the lecture notes on cuLearn.

To ensure that all announcements are received, students must 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.

Plagiarism Policy

There is a separate plagiarism policy document for this course that is located on cuLearn under the heading of Course Information. Students must read this document thoroughly and must agree to adhere to this policy (and to all policies stated in this course outline) before the assignment 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 assignment, the remaining weight associated with that assignment is shifted onto the weight of the final exam. Consider the following case as a clarifying 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 their 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.

Students are also required to have read:

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