**COMP 2804A&B (Winter, 2025)**

Discrete Structures II

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| **Instructor: Svetlana (Lana) Obraztsova** **Email:** [svetlanaobraztsova@cunet.carleton.ca](mailto:svetlanaobraztsova@cunet.carleton.ca) **Office Location**: HP5376 **Best Way to be in Touch:** during office hours  **Teaching Assistant:** A list of teaching assistants and their contact/office hours information will be posted once the course starts. | **Class Location****:** Please check Carleton Central for the room location  **Lecture Times:** 12 weeks, 2 lectures per week  **Tutorial Times:** No tutorials  **Course Website:** See Brightspace |

Important dates and deadlines can be found here: <https://carleton.ca/registrar/registration/dates/academic-dates/>, including class suspension for fall, winter breaks, and statutory holidays.

**Course Calendar Description**

Prerequisite(s): COMP 1805 with a minimum grade of C-, or permission of the School of Computer Science for those in Combined Honours in Computer Science and Mathematics.

**Learning Material(s) and Other Course/Lab-Related Resources**

Michiel Smid. Discrete Structures for Computer Science: Counting, Recursion, and Probability, 2019 (main textbook)

Eric Lehman, F Thomson Leighton, and Albert R Meyer. Mathematics for Computer Science, 2018 (supplementary textbook)

Everything needed for the course will be available for free on the course webpage in Brightspace.

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

**Topics Covered and Learning Outcomes**

Week 1. Course overview. Ramsey theory. (Chapter 1 in the textbook.) Product rule (section 3.1 in the textbook).

Week 2. Counting: bijection, complement, sum rules. Inclusion-exclusion principle. Binomial coefficients, Newton’s binomial theorem. Pascal’s triangle. Combinatorial proofs. (Sections 3.2-3.7)

Week 3. Counting continued. Pigeonhole principle. (Sections 3.9. 3.10). Quiz 1. Assignment 1 becomes available.

Week 4. Recursion (sections 4.1-4.5). Assignment 1 submission deadline.

Week 5. Recursion continued. Randomization and probability (sections 5.1-5.3)

Week 6. Probability basics continued. Midterm preparations. Quiz 2. Assignment 2 becomes available.

Week 7. Recess week.

Week 8. Midterm. Probability basics continued. Assignment 2 submission deadline.

Week 9. Independent events (sections 5.11-5.13).

Week 10. Infinite probability spaces, random variables, expected value (sections 5.15, 6.1-6.5). Quiz 3. Assignment 3 becomes available.

Week 11. Probabilistic methods (sections 6.8-6.10). Assignment 3 submission deadline.

Week 12. Geometric and binomial distributions. Probability on graphs. (Sections 6.6, 6.7, 7.1-7.4). Assignment 4 becomes available.

Week 13. Exam preparations. Quiz 4. Assignment 4 submission deadline.

**Assessment Scheme**

**Grade Breakdown**

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| **COMPONENT** | **GRADE VALUE** | **DATE** |
| Quizzes | 15 % | 22 Jan, 12 Feb, 12 Mar, 2 Apr |
| Assignments | 27 % | 31 Jan, 28 Feb, 21 Mar, 4 Apr |
| Midterm | 25% | 26 Feb |
| Final Exam | 33% | Will be published later |

Final exam will be closed books. Information about quizzes and midterm will be available before respective dates.

3 best assignments out of 4 will contribute to the grade. 3 best quizzes out of 4 will contribute to the grade.

**School of Computer Science Laptop Requirement** (only applies to on-campus courses)

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. This includes COMP1001, COMP1005, and COMP1006. 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/>.

**Undergraduate Academic Advisors**

The Undergraduate Advisors for the School of Computer Science are available in Room 5302HP; or by email at [scs.ug.advisor@cunet.carleton.ca](mailto:scs.ug.advisor@cunet.carleton.ca). The undergraduate advisors can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisors will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and Writing Tutorial Services.

**Academic Accommodations and Regulations**

**Academic Accommodation**

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 are outlined on the Academic Accommodations website (<https://students.carleton.ca/course-outline/>).

**Academic Integrity**

Please review the [Faculty of Science’s Academic Integrity website](https://science.carleton.ca/students/academic-integrity/) for suggestions for supporting

integrity.

“If you are unsure of the expectations regarding academic integrity (how to use and cite

references, if unauthorized collaboration with lab- or classmates is permitted (and, if so, to what degree), then you must ASK your instructor. Sharing assignment or quiz specifications or posting them online (to sites like Chegg, CourseHero, OneClass, etc.) is ALWAYS considered academic misconduct. You are NEVER permitted to post, share, or upload course materials without explicit permission from your instructor. Academic integrity offences are reported to the office of the Dean of Science. Information, process and penalties for such offences can be found on the ODS webpage: <https://science.carleton.ca/students/academic-integrity/>.”

Many of the assessed activities in this course were designed to be completed by an individual

working alone. Unless it is explicitly stated otherwise, the use of any AI system will be

considered academic misconduct. This includes, but is not limited to, chatbots or code

generators (e.g., ChatGPT, Google Gemini, Microsoft Copilot), research assistants (e.g., Elicit),

and image generators (e.g., Stable Diffusion, Dall-E), etc. An exception to this rule is made for automated grammar and punctuation checking tools (such as Grammarly).

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in [Carleton University’s Academic Integrity Policy](https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy-2021.pdf). A list of standard sanctions in the Faculty of Science can be found [here](https://science.carleton.ca/academic-integrity/).

**Student Rights & Responsibilities**

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the [7 Rights and Responsibilities Policy](https://carleton.ca/studentaffairs/student-rights-and-responsibilities/#sect1.1) for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.