Department of Mathematics and Statistics
MATH/CSCI 2112
Discrete Structures I
Summer 2019

1 General information

Note: One class will be held at Life Sciences Centre Common Area C242 on May 10. At the other times, classes will be at the Kenneth C. Rowe Management building, room 1020 (May 6, May 8, May 13 – July 30).

Lectures:	MWF 9:35am – 10:25am	Kenneth C. Rowe Manag. 1020
Lecture:	May 10, 9:35am – 10:25am	LSC-Common C242
Instructor:	Frank Fu	frank-fu@dal.ca (Please put "2112" in the subject line)
Office hours:	MW 11:00am – 12:30am	Chase building, room 251

2 Course description

This course, together with MATH/CSCI 2113, offers a survey of the following areas in mathematics: set theory, logic, mathematical induction, number theory, relations, functions, algebraic structures, and introductory graph theory. The discrete mathematics to be discussed in this course are fundamental to computer science.

3 Prerequisites

NS Math 441 or equivalent.

4 Course outcomes

- Become familiar with the basic concepts of set theory, logic, combinatorics and number theory.

- Understand the structure of logical arguments and mathematical proofs.

- Understand modular arithmetic and the relevant number systems.

- Calculate the number of possible outcomes for problems involving combinations and permutations.

- Prove properties of simple recursive functions.

5 Course materials

The course has a presence on BrightSpace `https://dal.brightspace.com/`, where course notes and related materials will be posted. For additional reading, students can use the following publicly available texts.

- *The Book of Proof* by Richard Hammack.

  Freely available from the author's website `https://www.people.vcu.edu/~rhammack/BookOfProof/`.

- *Lectures in Discrete Mathematics* by Edward A. Bender and S. Gill Williamson.

  Freely available from authors' website `https://cseweb.ucsd.edu/~gill/BWLectSite/`.

6 Course assessment

6.1 Assignments

Weekly assignments will be posted on BrightSpace.

6.2 Examinations

6.2.1 Midterms

There will be two midterms. Both midterms will last 1.5 hours. Textbooks, course notes and calculators are not permitted during the midterm exams.

- Midterm 1 will be held on May 31, Friday, 7pm-8:30pm, Marion McCain Arts and Social Sciences Building, Auditorium 1 (Scotiabank auditorium).

- Midterm 2 will be held on June 28, Friday. 7pm-8:30pm, Marion McCain Arts and Social Sciences Building, Auditorium 1 (Scotiabank auditorium).

6.2.2 Final

The final examination will last 3 hours. It will be held at Management building 1020 on August 2 (Friday), 9am-12pm. Textbooks, course notes, and calculators are not permitted during the final exam.

6.3 Policy on assignments and test

- **Homework**. Homework must be handed in at the *beginning* of class on the due date. Late assignments will not be accepted and will count as a 0 unless with instructor's prior permission.

- **Midterms**. If you miss a midterm exam without prior permission with me, then it will count as a 0. Exceptions are made in two cases: (1) if you obtain the instructor's prior permission to miss a midterm, or (2) if you have an officially valid excuse such as a medical doctor's note. In these cases, a made up exam will be arranged.

- Student declaration of absence forms will be accepted for missed homework, but not midterm or the final exam. To miss a midterm or final exam, you must always have a doctor's note signed by a medical professional.

6.4 Grading scheme

The final grade will be computed according to the following scheme.

	Scheme
Assignements	20%
Midterm 1	20%
Midterm 2	20%
Final	40%

The conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale given below.

$A+$	(90-100)	$B+$	(77-79)	$C+$	(65-69)	D	(50-54)
A	(85-89)	B	(73-76)	C	(60-64)	F	($<$50)
$A-$	(80-84)	$B-$	(70-72)	$C-$	(55-59)		

7 Resources

7.1 Learning center

Two *learning centers* are available to MATH/CSCI 2112 students where teaching assistants can provide help.

- The Mathematics and Statistics Learning Centre.

    https://www.dal.ca/faculty/science/math-stats/about/learning-centre.html

  Chase building room 119, hours for 2112:

  - Monday through Friday, 3-5pm, May 6 - July 1.
  - Monday through Friday, 1-5pm, July 2 - August 20, closed Aug. 5.

- The Faculty of Computer Science Learning Centre

    https://learning.cs.dal.ca/

8 Course topics

We will cover the following sections from *Book of Proofs*(BoP) and *Lectures in Discrete Mathematics*(LDM), in approximately the following order. I will also maintain an up-to-date version on BrightSpace.

- BoP 1.1-1.5, 1.10 Basic set theory.

- BoP 11.1-11.4, 11.6, 12.1, 12.2, 12.4. Relations and functions.

- BoP 2.1-2.6. Boolean logic and truth tables.

- BoP 2.7, 2.11, 5.1, 6.1. Quantified logic and deduction.

- BoP 10.1, 10.2. Mathematical induction, strong induction.

- BoP 3.1, 3.4-3.6 3.9 Basic counting, combinatorics and recursive functions.

- LDM NT-1. BoP 5.2, 11.5, 10.4. Basic number theory and its applications.

University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.
Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).
Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.
Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness
Statement: http://www.dal.ca/cultureofrespect.html

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).
Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)
https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Missed or Late Academic Requirements due to Student Absence (policy)

https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: https://www.dal.ca/faculty/science/current-students/academic-advising.html

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: https://libraries.dal.ca/

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: https://libraries.dal.ca/services/copyright-office.html

Fair Dealing Guidelines https://libraries.dal.ca/services/copyright-office/fair-dealing.html

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: https://dsu.ca/dsas

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Safety

Biosafety: https://www.dal.ca/dept/safety/programs-services/biosafety.html

Chemical Safety: https://www.dal.ca/dept/safety/programs-services/chemical-safety.html

Radiation Safety: https://www.dal.ca/dept/safety/programs-services/radiation-safety.html

Scent-Free Program: https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html

DALHOUSIE UNIVERSITY

<u>**Culture of Respect in the Faculty of Computer Science**</u>

Culture of Respect[1]

Every person has a right to be respected and safe. We believe inclusiveness is fundamental to education and learning. Misogyny and disrespectful behavior in our classrooms, on our campus, on social media, and in our community is unacceptable. We stand for equality. We hold ourselves to a higher standard. What we all need to do:

1 **Be ready:** promise yourself to not remain silent, know that it will happen again, summon your courage whatever it takes. Practice things to say, open ended is good: "Why did you say that?" or "How did you develop that belief?"
2 **Identify the behaviour:** Use reflective listening, avoid labeling, name-calling or blame. Describe the behaviour, don't label the person: "Kim, what I hear you saying is that ..."
3 **Appeal to principles:** this works well if the person is known to you like a friend, sibling, co-worker etc. "Joe, I have always thought of you as a fair-minded person, so it shocks me when I hear you say something like that."
4 **Set limits:** you cannot control another person, but you can control what happens in your space. "Please don't tell racist jokes in my presence anymore" or "This classroom is not a place where I allow homophobia to occur" and then follow through.
5 **Find an ally/be an ally:** seek out like-minded people for support or support others in their challenges. Lead by example and inspire others to do the same.
6 **Be vigilant:** change happens slowly, but be prepared, and keep speaking up. Don't let yourself be silenced.

Please see: https://www.dal.ca/faculty/computerscience/about/respect.html for more information and for a list of confidential & informal points of contact in our Faculty.

 Source: Speak Up! © 2005 Southern Poverty Law Center. First Printing. This publication was produced by Teaching Tolerance, a project of the Southern Poverty Law Center. Full "Speak Up" document found at: http://www.dal.ca/dept/dalrespect.html. Revised by Susan Holmes from a document provided April 2015 by Lyndsay Anderson, Manager, Student Dispute Resolution, Dalhousie University, 902.494.4140, lyndsay.anderson@dal.ca www.dal.ca/think

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