

# Department of Mathematics and Statistics

## MATH/CSCI 2112

### Discrete Structures I

### Summer 2019

## 1 General information

**Note:** One class will be held in the Computer Science building, room 127 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).

<b>Lectures:</b>	MWF 9:35am – 10:25am	Kenneth C. Rowe Manag. 1020
<b>Lecture:</b>	May 10, 9:35am – 10:25am	Computer Science 127
<b>Instructor:</b>	Frank Fu	frank-fu@dal.ca (Please put “2112” in the subject line)
<b>Office hours:</b>	MW 10:30am – 12:00am	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, Chemistry building, Room 125.
- Midterm 2 will be held on June 28, Friday. 7pm-8:30pm, Chemistry building, Room 125.

#### 6.2.2 Final

The final examination will last 3 hours. It will be held during the exam period and will be scheduled by the registrar. 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
Assignments	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>

- 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.