MATH2108A/COMP3101A
ABSTRACT ALGEBRA I/ALGEBRAIC STRUCTURES WITH COMPUTER APPLICATIONS
CARLETON UNIVERSITY
SUMMER 2020

Calendar Description: Introduction to algebraic structures: groups, rings, fields, lattices, and Boolean algebras; with applications of interest to students in Computer Science. This course may not be used to meet the 3000-level course requirements in any General or Honours program in Mathematics and Statistics. Precludes additional credit for MATH 2100.

Prerequisites: i) MATH2107 or MATH1102; and ii) either COMP1805/MATH1805 or MATH1800 (MATH1800 may be taken concurrently, with permission of the School); or permission of the School.

Instructor: Goldwyn Millar, goldwynmillar@math.carleton.ca

Office Hours: Monday to Friday, 9 AM to 5 PM (by appointment); Office hours will be held using BBB

Textbook: *Elements of Modern Algebra*, Gilbert/Gilbert, 8th edition

Lectures: Lectures will be posted online Monday and Wednesday of every week (except during holidays)

Tutorials: The TA will hold an office hour using BBB every Wednesday from 7:05 PM to 7:55 PM (starting on the second week of classes)

Grading Scheme:

- Weekly Assignments 50%
- Midterm Test 20%
- Final Test 30%

Assignments: An assignment will be posted every Wednesday (except when circumstances, such as the occurrence of holidays, interfere). Assignments are due

on the Friday of the week after they are posted (so, they are due exactly 9 days after they are posted). Late assignments will be accepted, but with a deduction of 10% for each day that elapses after the due date.

Tests: The midterm test will be held during the midterm exam period from June 19 to June 25. The final test will be held during the final exam period from August 17 to August 23. The exact dates are still TBD. The tests will both be open book, and they will be held online.

Academic Accommodations: Inform me as soon as possible if you need to request academic accommodations due to religious obligations, pregnancy, disabilities, or for any other serious reasons.

Tentative Lecture Schedule

Week	Dates	Sections	Topics
1	May 4-8	2.3	Divisibility
2	May 11-15	2.4	Prime factors and gcd
3	May 19-22	2.5	Congruences, CRT
4	May 25-29	2.5, 2.6	CRT, Congruence classes
5	June 1-June 5	2.8, Course notes	Intro to Cryptography
6	June 8-12	Course notes, 3.1-3.2	Cryptography, Groups
7	June 15	3.3, 3.4	Subgroups, Cyclic groups
8	June 19-25		**Midterm test**
			Midterm break
9	July 6-10	3.5, 3.6, 4.1	Iso/Homomorphisms, permutation groups
10	July 13-17	4.2, 4.4	Cayley's Theorem, Cosets of subgroups
11	July 20-24	5.1, 5.2	Rings, Integral domains
12	July 27-July 31	5.2, 8.1	Fields, Polynomials over a ring
13	Aug. 4-7	8.2	Divisibility, gcd,
14	Aug. 10-14	8.3, 8.4	Factorization in $\mathbb{F}[x]$, Zeroes of a polynomial