MAST 332 (COMP 367)
Techniques in Symbolic Computation
Winter 2021

Preface: Due to exceptional circumstances, this course will be taught and all assessments will be done completely ONLINE.

Instructor: Dr. A. Atoyan
Email: armen.atoyan@concordia.ca

Office hours: Monday, 13:30-15:00.

The textbook will be available at:
https://www.bkstr.com/concordiastore/home

Note: Students should order textbooks as early as possible, especially for printed versions in case books are backordered or there are any shipping delays.

Prerequisites: Mast 234 or Comp 248, Mast 217 or Comp 238.

Software: MAPLE (version 17 or higher). In this course the software is only used as a computational tool, not as an object of study in itself. Although there will be a brief overview of Maple procedures in the beginning of the course, an elementary knowledge of Maple is implied. All the assignments, the tests, and the final examination are written using MAPLE.

Course Description: This course is on application-oriented introduction to symbolic computation based on concepts in linear algebra, number theory and modular algebra.

Assignments: Assignments will be given, and should be submitted, online through Moodle as MAPLE files. Assignments are an important part of the learning process in this course and contribute 10% to the final grade.

Midterm Test: There will be one Midterm test based on the material learned in the previous weeks (1-6) which will contribute up to 30% to your final grade (see the Grading Scheme). It will be held during the regular class time on **Wednesday February 24, 2021**.

**NOTE:** It is the Department's policy that tests missed for any reason, including illness, cannot be made up. If you missed the midterm because of illness (to be confirmed by a valid medical note) the final exam will count for 90% of your final grade, and 10% will be contributed by the assignments.
Final Exam: The Final Examination will be 2 hours long (open-book exam, no notes or electronic material is allowed) written using MAPLE. Students are responsible for finding out the date and time of the final exam once the schedule is posted by the Examinations Office. Conflicts or problems with the schedule of the final exam must be reported directly to the Examinations Office, not to the Instructor. Students are to be available until the end of the final exam period. Conflicts due to travel plans will not be accommodated.

NOTE: There are no supplemental or alternate exams for this course.

Grade: The final grade will be based on the higher of (a) and (b) below:
(a) 10% for the assignments, 30% for the class test, 60% for the final exam.
(b) 10% for the assignments, 15% for the class test, 75% for the final exam.

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

Course Contents: Maple commands and procedures (an overview)
Number-theoretic problems, modular arithmetic
Diophantine Equations and Bezout’s Identity
Congruences, congruence classes and applications
Finite fields and Rings
Fermat’s and Euler’s theorems and applications
Hill Cryptosystem
Humming codes
Public key encryption codes (RSA)
Polynomial Rings
Polynomial Congruences
Chinese Remainder Theorem and applications

Academic Integrity and the Academic Code of Conduct
This course is governed by Concordia University’s policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. “Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia’s website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity.” [Undergraduate Calendar, Sec 17.10.2].

Behaviour All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

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