Department of Mathematics & Statistics
Department of Computer Science & Software Engineering
Concordia University

> **MAST 332 (COMP 367)**
> Techniques in Symbolic Computation
> ***Winter 2019***

Instructor:	Dr. A. Atoyan, Office: LB 1041.24 (SGW) Email: armen.atoyan@concordia.ca
Office hours:	Wednesday, 12:30-14:00 and Thursdays, 13:30-14:30.
Textbook:	*A Concrete Introduction to Higher Algebra*, by L. N. Childs, 3rd Edition.
Prerequisites:	Mast 234 or Comp 248, Mast 217 or Comp 238.
Software:	*MAPLE (version 15 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 done using *Maple.*
Laptops (optional):	The classroom for this course does not have hardwired computers installed. Therefore, although not mandatory, for efficient work in class students are encouraged to bring their laptops to the classroom and follow the course more interactively using the Concordia WIFI system.
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 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 in a computer-equipped classroom during the regular class time on **Thursday February 21, 2019.** **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 can count for 90% of your final grade, and 10% will be contributed by the assignments.

Final Exam: The Final Examination will be 3 hours long (**closed-book** exam, no notes or electronic material is allowed) written using MAPLE in the lab equipped with computers. 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 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, 10% for the class test, 80% 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
Error-correcting codes
Public key encryption schemes (e.g. RSA)
Polynomials and 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]*