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

MAST 332 (COMP 367)

Techniques in Symbolic Computation

Winter 2015

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Office hours: _____

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 (14 or higher)*. In this course the software is mainly 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 class and follow the course more interactively using the Concordia WIFI system.

Course Description: This course is on application-oriented introduction to symbolic computation, computation, as it is used in linear algebra and number theory.

Assignments: Several 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 of weeks 1-5) which will contribute up to 30% to your final grade (see the Grading Scheme). It will be held in computer-equipped class on **Thursday, February 19, 2015.**
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 and will test all the material covered in the course. 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

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.

Course Contents:
Maple 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 theorem and applications
Error-correcting codes
Public key encryption schemes (e.g. RSA)
Polynomials and Congruences
Chinese Remainder Theorem and applications.