Department of Mathematics & Statistics
Concordia University

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MAST 232
Mathematics with Computer Algebra
Winter 2015

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Office Hours: _____

Note: Mast 232 is an interactive presentation of a range of mathematical topics using *Mathematica*. Although the course is self-contained and requires no textbook, all students must have access to *Mathematica* 9 (or later version, see Appendix) either on their own computers or at the university facilities.

Prerequisites: *CEGEP* Mathematics 105, or 201 "NYC, 203 or 201" NYB or equivalent.

Exclusion: This is the first course in computer algebra using *Mathematica*. It may not be taken for credit simultaneously with, or after having already completed a course of a similar nature.

COURSE CONTENT

Week	Lectures	Assignments (approximate schedule)
Week 1	**INTRODUCTION**	
Week 2	Graphs in two and three dimensions	Assignment 1 (Weeks 1, 2)
Week 3	Numbers, lists and functions	
Week 4	Algebraic and transcendental equations	Assignment 2 (Weeks 3, 4)
Week 5	Derivatives and applications	
Week 6	Integrals and applications	Assignment 3 (Weeks 5, 6)
Week 7	**MIDTERM TEST**	
Week 8	*Mathematica* programming	Assignment 4 (Week 8)
Week 9	Sets and Boolean logic	
Week 10	Probability and statistical measures	Assignment 5 (Weeks 9, 10)
Week 11	Vectors, matrices, linear systems	
Week 12	Applications of linear algebra	Assignment 6 (Weeks 11, 12)
Week 13	**REVIEW**	

Lectures: Most lectures consist of two intertwined parts: an online presentation of new material, and an interactive instructor-supervised problem solving in class using *Mathematica*.

Assignments: Students are strongly encouraged to complete all assignments and compare their solutions with those posted on the *Moodle* website. Assignments contribute 10% to the final grade. Working on the assignments and checking the posted solutions are essential for doing well in this course.

Midterm Test: There will be **one midterm test**, based on the material of weeks 1-6, which will contribute up to 30% to your final grade (see the Grading Scheme). It will be held in the class of the week 7.
NOTE: It is the Department's policy that tests missed for any reason, **including illness,** cannot be made up. If you missed the midterm test 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.

Grading Scheme: The grading scheme is designed to balance achievement and encourage term work. The final marks in the course will therefore be based on the best of Scheme (A) and Scheme (B).

<u>Scheme A</u>:   <u>Scheme B</u>:
Assignments 10%   Assignments 10%
Midterm: 30%   Midterm: 10%
Final Examination: 60%   Final Examination: 80%

This course has no 100% final and no supplemental examination.

Moodle Website: Mast 232 is managed on a *Moodle* website. The site contains the course outline and other relevant material. In particular, the lecture notes, the assignments, and the solutions to the assignments are posted on the site as the course progresses. Only registered students have access to the website and all material on the site is confidential to the instructor, the teaching assistant and the registered students. The material posted in Moodle cannot be used elsewhere or transmitted to other party without the explicit written permission of the Instructor of the course.

Software License: The course requires *Mathematica 9 or higher*. Concordia University now has a site license for *Mathematica* and all registered students are entitled to install *Mathematica* on their personal computers *free of charge*. The process of installing *Mathematica* is described in the Appendix. Students who do not have access to a personal computer can do their work in the Arts and Science Learning Centre Labs on both campuses at posted hours. They can also borrow Library-owned laptops equipped with *Mathematica* to do their work.

Communication: Exchanges between students, professors and the teaching assistant take place in the *Moodle* forum and use the *Moodle* e-mail system. They are monitored and facilitated by the teaching assistant.

Disclaimer: The instructor reserves the right to make changes to the course outline and course contents should this be necessary for academic or other reasons. Every effort will be made to minimize such changes. The course website is the official repository of the course material and students are expected to consult the site for all information relevant to the conduct of the course.

APPENDIX

1. All Arts and Science Learning Centre labs have Mathematica installed. Access to the software is simple. It uses a student's *MyConcordia* net name as *username* and the student's *password*.
2. All Concordia students are entitled to borrow Library-owned laptops for specific lengths of time with Mathematica installed. Students are encouraged to verify that Mathematica is actually installed.
3. All registered Concordia students are entitled to download *Mathematica 9* from the Wolfram Research website and install it on their personal computers free of charge. The activation process is managed by IITS and consists of the following steps, as described by IITS.

To request Wolfram Mathematica at-home-use software:

1. Go to www.myconcordia.ca<http://www.myconcordia.ca> and login
2. Click on 'Personal Services' then 'Mathematica'
3. Agree to the terms and conditions to continue
4. You'll be brought to a Wolfram Mathematica page. The user will have one of three options to select (new users must select 'A new home-use license'):
    a. A new home-use license
    b. An upgrade for an existing home-use license
    c. A extension for an existing home-use license
    d. Click 'Continue' to proceed
5. The Home-Use Mathematica License Request Form will appear. The user will have to select one option for each of the following questions: How would you like to receive your copy of Mathematica?
    a. Download - Send it to me at the email address I specify (You will be asked for your email address later) - (*USERS SHOULD SELECT THIS OPTION*)
    b. Download - Send it to my Site Administrator
    c. CD - Send it to me at the address I specify (You will be asked for your address later)
    d. CD - Send it to my Site Administrator
6. For what platform will you need your home-use license?
    a. Windows
    b. Macintosh
    c. Linux-PC
7. Would you also like to receive a download of Wolfram Workbench for this home-use license?
    a. Yes - Send me Wolfram Workbench for the platform above
    b. Yes - Send me Wolfram Workbench for Eclipse users
    c. No
8. Click 'Continue' to proceed
9. The Home-Use Mathematica License Request Form will appear. The user will have to enter the following information (* Note: Required field):
    a. First name *
    b. Last name *
    c. Email address *
    d. Work Address (*ENTER YOUR CONCORDIA UNIVERSITY EMAIL ADDRESS*)
    e. Work Phone *
    f. Home Address*
    g. Home Phone *
10. The request is forwarded to the IITS Site Administrator for approval. If approved, the user's license, activation key and link to download the software will be sent to them at the email address they provide.
11. It usually takes 1-2 business days for a license key request to be approved.
12. The process above is the same if a user wants to renew an existing license or upgrade the software.