

University of Western Ontario
Course Outline for Applied Mathematics 4615b/ 9563b (formerly 475b)
Winter 2010, Introduction to Applied Computer Algebra

Instructor: Greg Reid

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Initial location of course web site (click courses): <http://www.orcca.on.ca/~reid>

Web site will later be maintained on web ct

First class for the course: Wednesday Jan 6, in NCB 105, 12:30 - 1:30pm

You should receive an online request for scheduling purposes - if not please email me

It is your responsibility to regularly check the course web site for announcements, assignments, important dates etc (at least several times a week).

Initial scheduled time for lectures: Initially M–W–F 12:30 – 1:30 pm, NCB 105

Text: Instructor's notes and other refs. TBA.

Contents of Course: Computer algebra, or more accurately symbolic computation, corresponds to algorithms for performing mathematics (calculus, geometry, algebra, numerics) automatically by computer. This course is an introduction to computer algebra, with an emphasis on applications. This emphasis is on preparing the student to use symbolic computation in mathematics, science, and engineering.

Topics include: introduction to programming; numerical Newton and fixed point iterations; using computer algebra as a symbolic calculator; introduction to problem solving environments (specifically the MapleSim environment in Maple); exact methods for systems of equations (especially Gröbner bases and triangular decomposition); simplification and normal forms; complexity, stability and quality of algorithms; exact methods for PDE; various applications from physical and life sciences.

The student should have had some experience with using a computer package (e.g. Maple, Matlab or Mathematica); and some beginning experience in programming (e.g. Fortran, Matlab or c, etc). They should have had an introduction to numerical methods; vector calculus; linear algebra. Students are expected to develop their ability to write solutions and this will be a component of assessment (i.e. English description, rather than just formulae).

Description of evaluation:

Assignments & Quiz(25/100), **1 Midterm, mid-semester, date TBA**(20/100), **Project proposal is due on February 12, max 1 page**(5/100), **A draft of the project is due on March 8, max 8 pages** (10/100), **Project presentation and final Version of Project (due on April 10, max 25 pages)**(40/100)

The project presentation (details TBA, will be videoed). Graded assignments and quizzes will all be equally weighted. There will be no make-ups on missed quizzes or assignments. However, you will be able to drop your lowest two scores (e.g. if these were an assignment, and a quiz score then you would drop those two). Attention should be paid to material from lectures, refs. and web site, to gain a complete view of expectations for course. Over-reliance on one source is unwise. Note also that the web site, does not contain a complete list of announcements. Quizzes and exams will generally be carried out in a lab with a written and a computer component. Graduate students will have Quiz/Assignment/Midterm problems designated for them.

The term is divided into periods of roughly 1.5 - 2 weeks. Assessment by Quiz or hand in assignment will be carried out roughly each period, and will test material up to the end of the previous period.

Plagiarism and Cheating: are serious offenses and should read the UWO policy on this matter, which we adopt: <http://www.orcca.on.ca/~reid/Courses/PlagiarismUWOPolicy.html>

See next page for further important info

Addendum to all Applied Mathematics Course Outlines

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to your faculty's Dean's Office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from your faculty's Dean's Office immediately. For further information please see:

<http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>

and https://studentservices.uwo.ca/secure/medical_accommodations_link_for_OOR.pdf

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here:

https://studentservices.uwo.ca/secure/medical_document.pdf