CSC260S: An Introduction to Scientific, Symbolic, and Graphical Computation
Department of Computer Science
University of Toronto

Instructor: Eugene Fiume, SF4306B (elf@cdf.utoronto.ca)

Office Hours: Mondays/Wednesdays, 2:00pm
Lectures: 1:00pm Mondays and Wednesdays, MP102
Tutorials: 1:00pm Fridays
Tutors: Stephan Jou, MP102; Hong Qin, MP118; Radek Grzeszczuk MP203; Meng Sun SS1074; Hiroshi Hayashi SS2128

Overview. The broad goal of the course is to create an awareness of the problems involved in transforming mathematical models defined over a continuous domain to discrete computational models. No general theory of this transformation exists, although more advanced courses deal well with specific aspects of the transformation. Our focus will be two-pronged. First we shall explore aspects of computational mathematics using specific, hopefully interesting applications as our inspiration. Second, we shall study some of the transformations required to go from model to implementation. These two broad approaches will be interleaved. For the first approach, we shall use a symbolic algebra system to display, simplify, and reason about a model. For the second, we shall use a traditional programming language to implement efficiently some algorithms. You will not be building large programs in this course, but the programs you write will be challenging.

Topics Covered. Many of the topics covered in this course will be expanded on in separate upper-level courses. Some topics are unique to this course. The main topics we shall cover are: parameterisation, interpolation, approximation, sampling, signal theory, integration. The mathematical and computational aspects of each topic will be explored. Each of these topics has a very rich literature, and we cannot possibly cover them in depth or with great rigour. However, by motivating these topics using attractive examples, a strong sense of each topic will be conveyed. There is a good deal of math in this course.

The assignments will involve programming in both Maple and Object-Oriented Turing or C on the CDF Sun workstations running under UNIX and X-Windows.

Evaluation.

Number	Description	Weight
3	Assignments	40%
1	Term Test	15%
1	Final Exam	45%

Textbook.

E. Fiume, *An Introduction to Scientific, Symbolic, and Graphical Computation*, AK Peters, 1995.

It is important to become acquainted with Unix, Object-Oriented Turing or C, and Maple V, so you may find it useful to pick up a language reference book for the language(s) you don't know. My book gives references to such books.

Dates and Weights. Assignment weights are approximate.

Date	Description	Approximate Weight
10 February	Assignment 1 due	10%
24 February	Midterm	15%
10 March	Assignment 2 due	15%
7 April	Assignment 3 due	15%

Assignment Submission. Assignments will be submitted electronically, and are due as of midnight on the indicated date. Unless specifically requested, hardcopy submissions are not acceptable. The late policy is:

Submission time	Penalty
By midnight of the first day after the deadline	–10%
By midnight of the second day after the deadline	–20%
By midnight of the third day after the deadline	–40%
By midnight of the fifth day after the deadline	–70%
Past midnight of the fifth day after the deadline	forget it

Exact submission instructions will be posted.

Plagiarism. By putting your name to the work you submit, you are claiming that the submitted work is a product of your intellectual effort. It is one thing to discuss aspects of your assignment with colleagues. This is in fact encouraged. However, it is an academic offence to hand in anything written by someone else (or derived from someone else's work). Credit your sources if a book or a person has helped you in some tangible way.

If you find yourself in a situation where you are being coerced or forced into giving up your solutions, then please see me immediately.