

csc338 – Numerical Methods

Numerical methods are algorithms for solving practical problems in applied mathematics. They are used extensively in many areas of science, engineering and business. They are crucial to computational finance and portfolio management, computer games, graphics and special effects, robotics and bioinformatics, data mining and machine learning, and many other areas. Numerical methods are run on computers of all sizes, from laptops to workstations to supercomputers. In fact, the need to solve large and complex problems with numerical methods is the main reason supercomputers were developed.

Prerequisites: Informally, a basic knowledge of calculus, linear algebra and programming. Formally, CSC207H5/270H5, 290H5; (MAT134Y5/135Y5/137Y5)/(MAT133Y5, 233H5), MAT223H5.

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Classes: Wed 4–6pm, NE 140.

Tutorials: Tue 4–5pm, SE 3093. Tutorials may introduce new material not covered in lectures or in the text.

Web Page: <http://www.cs.toronto.edu/~bonner/courses/2009s/csc338/>

Grading Scheme: Four assignments, 15% each; Midterm test, 10%; Final exam, 30%. On all work, 20% of the mark will be for quality of presentation, including the use of good English. The final exam and midterm will be based on the assignments and will assume that you have completed them by yourself. Final marks may be adjusted up or down to conform with University of Toronto grading policies. Late assignments will not be accepted.

Text: Michael Heath, *Scientific Computing: An Introductory Survey*, Second Edition, McGraw Hill, 2002. Roughly the first half of the book will be covered. The relevant chapters are being made available by McGraw hill at a special price.

Topics Covered: Numerical errors and computer arithmetic, systems of linear equations, linear least squares, nonlinear equations, optimization, interpolation.

Plagiarism and Cheating: The academic regulations of the University are outlined in the *Code of Behaviour on Academic Matters* which can be found in the UTM Calendar or on the web at <http://www.utm.utoronto.ca/regcal/WEBGEN117.html>.