1. **Professor.** Dr. Joel S. Cohen.

2. **Office and Office Hours.** Office - John Greene Hall, room 214. Office hours - to be determined

3. **Phone Numbers.**
   - Professor Cohen’s Office - 303.871.3292.
   - Computer Science Department Office - 303.871.3344.
   - Home - 303.321.1219 (emergencies only please)

4. **email** - jscohen@cs.du.edu

5. **Graduate Teaching Assistant.** - Melissa Butler
   - Office - John Greene Hall, room 327.
   - Office Phone -(303) 871-2002.
   - Email - mbutler2@du.edu
   - Office Hours - to be determined.


7. **Course Content.** *Computer Algebra* is the field of mathematics and computer science that is concerned with development, implementation, and application of algorithms that manipulate and analyze symbolic mathematical expressions. Computer algebra software is now readily available that can simplify algebraic and trigonometric expressions, factor polynomials, differentiate and integrate complicated functions, solve algebraic and differential equations, and perform many other operations encountered in applied mathematics, science, and engineering. This course provides an introduction to computer algebra. Its two main objectives are:
   - a study of the development and computer implementation of algorithmic approaches to mathematical problems.
   - a description of some of the elementary algorithms that are utilized by computer algebra software.

Specific topics include the following:

- The use of the Mathematica software as *symbolic calculator* to solve problems in algebra, trigonometry, and calculus.
- A description of the evaluation process in computer algebra software including the automatic simplification of mathematical expressions.
- The description of expression structure using expression trees and a survey of the primitive operations used to analyze, manipulate, and construct these trees.
• An introduction to computer algebra programming techniques including recursion.
• The development and implementation of algorithmic approaches for more involved mathematical problems. For example, we develop an algorithm that can evaluate some indefinite integrals.
• The development of algorithms for the analysis and manipulation of polynomials and rational expressions. These include algorithms for degree and coefficient computation, polynomial expansion, coefficient collection, and rationalization of expressions.
• The development of algorithms for manipulation and simplification of trigonometric expressions. These include algorithms for trigonometric expansion, trigonometric contraction, and verification of trigonometric identities.


9. **Software.** Mathematica 5.2 (Student Edition). Mathematica 5.2 is available as a download from Wolfram Research located at www.wolfram.com

   From the main page, under *Current Highlights* on the right side of the page, select

   *Mathematica for Students*

   On the right side of this page, select

   *Low Student Prices*

   You have three choices

   • Mathematica for Students: Semester Edition - six month license for $44.95.
   • Mathematica for Students: Annual Edition - one year license for $69.95.
   • Mathematica for Students: Standard Edition - unlimited time as long as you are a student for $139.95.

   All versions offer the same features. Select the version you want, and on this page under *Options*, select the operating system of your computer. Click on *Add to Cart* and continue with the billing process. You will be asked to provide some proof that you are a current student at DU. (If that information is not immediately available, Mathematica provides a two week temporary license.) Let me know if you have problems doing this.

10. **Prerequisites.**

• Calculus (MATH 1950.1,2,3).

• This is a laptop course, and so you must have a laptop computer to register for the course.

11. **Exams, Projects, and Other Work.**

• Interactive computing with the Mathematica software.

• Computing and mathematics exercises.
• Computer programs in the Mathematica programming language.
• Mid-quarter exam - Monday, May 1, 2006.
• Final exam - Monday, June 5, 2006. The final exam covers the entire course.

12. Grades. Grades are computed using the following weights

• Computer Programs and other homework assignments 35%.
• Mid-quarter Exam - 30%.
• Final exam 35%.

13. Drop policy. You can drop the course with an automatic grade of W (withdraw) any time on or before Monday, May 8.

Between May 8 and May 19, you can still drop the course, however, during this time period you need my approval and the approval of the Center for Academic Resources. In this case, your grade in the course will be W (if you are passing when you drop) or F (if you are failing when you drop).

You cannot drop the course for any reason after Friday, May 19, 2006.