Math 310-01 Introduction to CAS (Mathematica)

Spring Quarter 2008, MW 6:10 – 7:50 PM, SH-C259

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Office Hours: **Mon & Wed 5 – 6** in SH C259;

Mon: 10 – 12 & 2 - 3, Tue: **10 – 12 Wed: 1 – 2, Thu 9 – 12 & 1 – 3** and by appointment

Prerequisite**: Math 206 with minimum grade of C; CS 201 recommended**

The course will be held in the computer lab. In order to access *Mathematica*, you will need an NIS account. To apply for an NIS account, go to the ATS office located in **Library South** to fill out an application. You will be asked to present a current student ID card or a valid ID and proof of registration before the application can be accepted. You will be asked for identification when you pick up your account.

Learning Objectives: After taking this course, students will

- Be able to use built-in Mathematica functions correctly
- Know how to find out about usage and availability of built-in functions
- Write their own functions and simple programs based on Mathematica functions
- Visualize functions and data using built-in graphics functions
- Produce animations.

Text: **Getting Started With *Mathematica*,2nd Edition,** C-K. Cheung, GE. Keough, C. Landraitis & R.H. Gross, Wiley & Sons, 2005 (recommended)

The course will be based primarily on *Mathematica* notebooks that I have developed. These notebooks will be posted at my web site for downloading. The recommended text is a good reference for using the built-in functions in various areas of application (differentiation, integration, different types of plots,....) and it also has nice segments on trouble-shooting at the end of each section.

There are many different books on *Mathematica,* and they basically fall in one of two categories – either showing how to use the built-in functions for various areas of mathematics or focusing on programming in *Mathematica*.

The recommended text falls into the first category - it is a good reference for help when you need *Mathematica* to do basic things for a variety of courses, but it will not give you the insight needed to take *Mathematica* to the next level. Our library has a good selection of books on *Mathematica* and you should go and browse through them just to get an idea of where *Mathematica* can be used. The website of Wolfram Research (http://store.wolfram.com/catalog/books/) has the most complete list of *Mathematica* books. If you have a particular area of mathematics/application in mind, I can give you some recommendations for books that I have found useful.

Course Overview:

In the first part of the course you will learn *Mathematica* basics, such as operations, number types, how to get help, etc. We will also do a "tour" of some built-in functions, covering basic symbolic manipulations and the many ways to work with and graph data. In the second part of the course you will learn how to program your own functions, using the built-in functions. Overall, at the end of the course you should be able to use *Mathematica* for your courses and also be able to do some basic programming.

Course Grade:

- There will be **homework assignments** most weeks, some of which may be done in groups of two (I will indicate which assignments can be group work!). The homework assignments of a given week are due on Wednesday of the following week. You are to hand in your homework by emailing it to me (sheubac@calstatela.edu). Detailed instructions on how to do this can be found at the course website (Homework Format). **Make sure to always save a copy of your work on thumb drive or on a hard drive.** Doing homework is where you learn and prepare yourself for the quizzes and exams. (20 %)

- There will be 5 **quizzes** on the Wednesdays of weeks 4, 5, 7, 8 and 9. (15%)

- The **midterm** on **April 30** covers the first part of the course. (20%)

- The **final** on **Wednesday, June 4, 7:30 – 10 PM** will focus on the second part of the course, but is cumulative in the sense that you will utilize what you have learned about the Mathematica functionality in the first part. (25%) **No make-up for exams or quizzes!**

- There will be one **project**, which can be done in groups of two. This project will focus on combining several functions to form a larger whole. You can select from some projects I have developed, or create your own. If you have an idea for your own project, it needs to be approved by me. You need to discuss your idea for a project by **April 23**, so that we can develop it. (20%)

You will receive updates about your class standing after each graded assignment via email. **Attendance and class participation will be taken into account**. The following grades will be guaranteed:

90%-100%	A/A+	80% - 89%	B-/B/B+	70% - 79%	C-/C/C+
60% - 69%	D/D+	below 60%	F		

In order to get the most out of this course it is important to spend enough time with *Mathematica*. There will be times when you get stuck, but you can always email me with your questions (best to send the notebook with your work, so I can have a look). Failures and making mistakes is where learning occurs, so do not give up easily. Come see me for help when you need it – especially when working on the projects. Give yourself enough time for work on the assignments and projects – do not wait until the last minute as Murphy's law lurks around the corner…. and technology has the tendency to fail exactly when you need it most!

Mathematica 5.2 (or hopefully 6.0) is installed in all open access labs on campus. If you want to purchase the student version of Mathematica so that you can work from home, you can do so online. There are various pricing options: $44.95 (6 months), $69.95 (12 months), but if you can afford it, I suggest you get the full student license (139.95) rather than the limited-time version. It gives you the full functionality of the professional version. All versions can be purchased for Windows, MacOS and Linux. The website for downloads is http://www.wolfram.com/products/. You can also access this link from my web page.

There has been a major upgrade from Mathematica 5.2 to Mathematica 6.0. I am not sure whether Mathematica 6.0 will be installed on the campus computers, so I will try to work with both systems. I will keep you posted….