Mathematics 103X Honors Intermediate Calculus Fall 2006

Section 02 MWF 11:55am–12:45pm Physics building 299

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Course web site: Assignments, announcements, and other course material will be posted at http://www.math.duke.edu/~ng/math103x/ . Grades will be posted on Blackboard, http://blackboard.duke.edu/ .

Textbook: *Vector Calculus*, third edition, by S. J. Colley.

Office hours: Tentatively **3:00-4:00pm on Tuesdays and Wednesdays**, and by appointment. To set up an appointment, e-mail me, but please keep in mind that I can't usually answer e-mail immediately; on occasion it may take a day for me to respond.

Course information: This is a more theoretical version of Mathematics 103 but covers much of the same material: vector calculus, curves and surfaces in 2D and 3D, multivariable differentiation, max/min problems, multivariable integration, and Green's, Stokes', and divergence theorems.

Structure: The course will be loosely divided into four sections. Here is a tentative outline:

I. Vector geometry and curves and planes in 2D and 3D	
Vector algebra	Sections 1.1, 1.3, 1.4
Lines, planes, distances	Sections 1.2, 1.5
Curves in 3D	Sections 3.1, 3.2
II. Multivariable differential calculus	
Functions of several variables, limits, partial derivatives	Sections 2.1, 2.2, 2.3, 2.4
Chain rule, directional derivatives, gradient	Sections 2.5, 2.6
Linear approximation, max/min problems, Lagrange multipliers	Chapter 4
III. Multivariable integral calculus	
Double and triple integrals	Chapter 5, Section 1.7
Vector fields and line integrals	Sections 3.3, 3.4, 6.1
Surface integrals	Sections 7.1, 7.2
IV. Fundamental theorems of vector calculus	
Green's Theorem, conservative vector fields	Sections 6.2, 6.3
Stokes' Theorem and the divergence theorem	Section 7.3

Grading: Your grade will consist of a weighted average of in-class tests (60%), the final exam (30%), and homework (10%).

- **Homework:** I will assign weekly homework, mainly out of the book. Not all problems will be graded. The primary purpose of the homework is to help you learn the class material, and you must write up solutions to all problems. *Always show work*—this helps you find mistakes in your solutions, and it helps with the assignment of partial credit. You may not receive full credit if steps are missing in your solution.

  You are encouraged to work with other students in the class on the homework, but you must write up the homework *by yourself* (no copying!), and acknowledge any collaborators. *No unexcused late homework will be accepted.* Your two lowest homework scores will be dropped.

- **Tests:** There will be four in-class tests, roughly covering each section of the course. No calculators are allowed. The first two tests are tentatively set for **September 20** and **October 6**. You will only be excused from a test if you have prior written authorization from your dean or you have a serious short-term illness; in the latter case, you need to fill out the Short-Term Illness Notification form (linked from the first-year information web page, see below).

- **Final examination:** The final exam will be given on **Thursday, December 14** from **7:00-10:00pm**. Note that this is in the math block exam time slot and not the usual slot for the class time.

Computing: Calculators and computing programs such as *Maple*, *Mathematica*, *Matlab*, etc., will not be necessary in this course.

Other information: `http://www.math.duke.edu/first_year/f_y_info.html` is a useful web site with general information about first-year math courses, the Help Room, what to do in case of illness, etc.

Under construction: This syllabus is subject to change; I will inform you of any changes. The latest syllabus can always be found at the course web site.