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Syllabus for MA213-001, 002 Fall 2007

MA213 is a one semester course in multivariable calculus. Here is summary contact information as well as times and locations of class meetings and the like.

MA 213 Sections 1, 2	Lecture	Recitation 001	Recitation 002
Instructor	Ken Kubota	Ping Zhang	Ping Zhang
Office	955 P.O.T.	722 P.O.T.	722 P.O.T.
Phone	257-3641	257-6807	257-6807
E-Mail	ken@ms.uky.edu	pzhang@ms.uky.edu	pzhang@ms.uky.edu
Office Hours	M12-1	T 11-12,W 1-2	T 11-12, W 1-2
Mathskeller Hours	WF10-11:30	F 1-2	F 1-2
Class	MWF 8 CB349	TR 8 CB 349	TR 9:30 CB349

In addition to normal Office Hours and Mathskeller Hours, you can also make appointments to see either of the instructors -- just see them before or after class or send e-mail. Also, if you feel that a group problem session is preferable, just ask that it be organized.
There will be two examinations scheduled during the semester and will likely be in-class. In addition, the **final examination** will be comprehensive and held in CB 349 on Monday Dec 10 at 8:00 - 10:00 A.M.

Gernerallties: MA 213 (Calculus III) is a third course in calculus. Its prerequisite is MA 114 (Calculus II) or equivalent.

Credit: MA213 earns four credit hours.

Instructors and Class Meetings: Both sections have a common lecturer in addition to a recitation instructor. Lectures are MWF 8:00-8:50 in CB 349. Recitations are TR at different times and places for different sections as shown in the table above. Each recitation session is 50 minutes in length. In length. Attendance at all lectures and all recitation sessions for the section in which a student is enrolled is required.

Textbook: The textbook is *Calculus* by James Stewart, fifth edition, Thomson Brooks/Cole 2003. The fourth edition textbook is substantially (over 90%) identical to the fifth edition and probably can be obtained at a substantially reduced cost. If you are thinking of trying to make do with an earlier edition, you might want to drop by and do a comparison with the fifth edition to see how much of a hassle it is likely to be.

Homework: This course uses a web based homework system called WHS. Students use the system to obtain homework assignments as well submit them for grading and, in general, to aid in communicating with their instructors as well as for tracking their progress in the class. There are typically an assignment per section or per two sections of the textbook. These problems will include ones that are very similar to the problems which will appear in the examinations and so are good preparation for each examination. Each student has a personal version of each assignment which must be completed before the assignment deadline. There are typically both a recitation session and a lecture on the material before the final assignment deadline. The system records the number of problems which are submitted with a correct answer. If you submit an incorrect answer, you are allowed to submit again (as many times as needed) until you have the answer correct. There is no penalty for submitting an incorrect answer. Students are permitted and, in fact, encouraged to work together on the homework problems. Submissions of versions other than the student's personal version as well as submissions after the deadline (midnight of the due date) receive no credit.

Examinations: There will be two examinations and one final exam. The examinations will typically be scheduled during a lecture, the date being announced at least a week in advance; they will be the same examinations for both sections. Each of the examinations will be focused primarily on the material from the lectures, recitation, and homework for that exam. However, students are responsible for all material covered up to that exam, including material from previous exam periods. The final will be over all the material of the class.

Exams are paper tests and will be hand-graded by the instructors whose primary concern will be an evaluation of the understanding of the material communicated by the student's work. Students are both permitted and expected to use calculators on the examinations for routine arithmetic and built-in function evaluation. Sophisticated features may be used for to gain intuition about a problem or for cross-checking answers. However, `answers' simply taken as output from calculator routines will generally not receive any credit.

Course Topics: The following are the general topics planned for the individual examinations. These are subject to change, depending on the progress of the course.

Chapter 13 Vectors: Review and calisthenics of selected ideas and skills of MA114, Cartesian coordinates in 3-space, distance, vectors and vector operations including dot and cross products, lines, planes and quadric surfaces, cylindrical and spherical coordinates. Except for the review, most of this chapter is algebraic preliminaries to multivariate calculus.

Chapter 14 Vector Functions: Vector valued functions and curves in 3-space, their algebraic operations as well as differentiation and integration, arc-length, curvature and torsion of curves and their relation to velocity and acceleration.

application to the two body problem. This chapter is basically the study of the geometry of functions of one variable with values which are vectors of 2 and 3 dimensions. It is a transition between one and several variable calculus.

Chapter 15 Partial Derivatives: Real valued functions of several variables, limits, continuity, and partial derivatives, gradient and linear approximation via tangent planes, the chain rule and directional derivatives. Maximum and minimum problems, second derivative test, and Lagrange multipliers. This chapter is a complement to the previous one: we now have the domain consisting of n-tuples, but the range consists of real numbers. One focuses on how the differential calculus results of MA 113 extend to these functions and the ways in which the additional variables allow for more complex behavior.

Chapter 16 Multiple Integrals: This chapter is the integral calculus extension for the same kinds of functions as appear in Chapter 15. So, one integrates a real valued function, but the region of integration is either two dimensional (double integrals) or three dimensional (triple integrals). It happens that, for instance, double integrals can be evaluated as a single integral of another single integral giving rise to the idea of iterated integrals and Fubini's Theorem. For practical reasons, one needs to be able to do the operations in polar, cylindrical, and spherical coordinates as well as in Cartesian coordinates. The chapter also discusses surface area and change of variables -- which really involves the study of vector valued functions of several variables.

Chapter 17 Vector Calculus: Vector fields (vector valued functions of several variables), and line integrals (single integrals where the region of integration is a curve rather than an interval). Far reaching generalizations of the MA113 Fundamental Theorem of Calculus. One of these is for line integrals and is related to conservative force fields. The second one is Green's Theorem which tells you how to replace a double integral over a region with a line integral around the boundary. If there is time, one will investigate other similar results.

Grades: There are a total of **400 points** to be earned in the course. The grading scale is:

A At least 90% or at least 360 points

B At least 80% or at least 320 points

C At least 70% or at least 280 points

D At least 60% or at least 240 points

E Below 60% or below 240 points

These points can be earned through the following activities:

Exams and Final	295 points	74% of course grade
Online homework	30 points	8% of course grade
Attendance	15 points	4% of course grade
Recitation	60 points	15% of course grade
Total	400 points	100% of course grade

Exams and Homework: Each exam counts **100** points including **90** points for the exam itself and **10** points for the on-line homework. The exam part of the grade is curved by adding a non-negative integer adjustment so as to make the overall mean score on the exam no smaller than 75%. The homework points are the portion of the homework problems that were answered correctly times 10, rounded to the nearest integer.

The calculation for the final exam is similar to that of the other exams except that there are 115 points for the final and 10 points for the homework, giving a total point count of 125.

Attendance: Attendance will be taken at each lecture. There are 15 attendance points. Each student is allowed two unexcused absences from lecture. Each unexcused absence beyond those two deducts two attendance points.

Recitation: Recitation points will be assigned by the recitation instructor. The assignment will be on the basis of attendance, participation, and in-class graded work which may be done both individually and in groups.

modified: Tuesday, August 21, 2007

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