# MATH 200: Multivariable calculus, course outline.

### Textbook

James Stewart, Calculus (edition 7). Note: If you have Edition 6, it is also fine. (You will see chapter numbers listed for both editions below).

### **Exams and Marking**

Course mark will be based on the Webwork (10%), two midterms (20% each) and the final exam (50%).

1st midterm: Monday, October 7, 6:20-7:40pm.

2nd midterm: Monday, November 4, 6:20-7:40pm.

The two midterms will not overlap in the material covered. The final exam will cover the entire course. The midterms and the final exam will be common between all sections, and marked jointly.

# Policies

Missing a midterm results in a score of 0, except with prior consent of the instructor or with a doctor's note. In these latter cases, you will be allowed to take a make-up midterm; dates and times of make-up midterms will be announced later. If you anticipate having a valid conflict with the announced midterm times, please send an e-mail to math200dictator@gmail.com. If you fail to notify the Instructor-in-charge of a conflict via this e-mail before October 4 and November 1, respectively, you may not be allowed to take the make-up exam, and your score will be 0.

Each Webwork assignment generally closes at 11:59pm on Sunday night (please look at the dates carefully in case there are some deviations). No extensions are possible.

If for any reason you have to miss the final exam, it is the university-wide policy that you need to apply for "standing deferred" status through your faculty. Missed finals are not handled by the instructors or the Mathematics Department.

#### Homework

All homework assignments should be submitted online through **Webwork**. Please use Piazza as the main resource for help with webwork-related (nonconceptual) questions. It is a forum, which will be monitored by our TA, where you can post questions and answers about webwork. Please use the "e-mail instructor" button in webwork *only* if the question is not answered on Piazza, and you posted it and did not receive an answer.

## (Approximate) week-by-week course outline

Chapter numbers are given for Edition 7; the numbers from Edition 6 are in parentheses, when they are different. Please note that this is only an approximate outline; it may be updated as the course progresses. Please also check the individual sections' websites for more specific information about your lectures.

**September 4-6:** 12.1: Three-dimensional coordinate systems; 12.2: Vectors; basic operations with vectors; length of a vector, equation of a sphere in space, unit vector in a specified direction.

**Sep. 9-13:** 12.3 Dot product; Using dot product to find an angle between lines. Application to finding forces. 12.4 Cross product. Using cross product to find a vector orthogonal to two given ones; cross product and area.

Homework 1 (on 12.1, 12.2, beginning of 12.3) due on Sunday September 15.

**Sep. 16-20:** 12.5 Equations of lines and planes. Symmetric and parametric equations of a line in space. Equations for planes in space. Equations for a line of intersection of two planes, etc. Finding distances in space: distance from a point to a plane, etc.

Homework 2 (on 12.3, 12.4) due on Sunday September 22.

**Sep. 23-27:** 12.6 Cylinders and quadric surfaces. Reading assignment: 10.5 (Conic Sections). 14.1 "Functions of several variables". (In edition 6, this is section 15.1). 14.3 "partial derivatives". One additional topic to recall here: parametric equation of a segment connecting two points A and B.

Homework 3 (on 12.5) due on Sunday September 29.

Sep. 30-Oct. 4: 14.4 "Tangent planes and linear approximations". Differentials. Review if time permits.

Homework 4 (on 12.6 and 14.3) due on Sunday October 6.

Oct. 7-11: Midterm 1, covering Chapter 12 and 14.1-14.3 on October 7, 6:20-7:40pm. 14.5 "Chain rule"; start 14.6 (respectively, these are sections 15.5 and 15.6 in the 6th edition).

Homework 5 (on 14.4 and beginning of 14.5) due on Sunday, October 13.

**Oct. 14-18:** 14.6 (or 15.6) "Directional derivatives and gradients", continued. Implicit differentiation (if not covered earlier). Geometric meaning of the gradient. Tangent planes to level surfaces. Catch-up on sections 14.5-14.6. Homework 6 on 14.5 and the beginning of 14.6 due October 19.

**Oct. 21-28:** Section 14.7 (critical points): the second derivative test, absolute maximum and minimum values.

Homework 7 on the rest of 14.5 -14.6 due October 26.

**Oct.28** – **Nov. 1:** 14.8 Lagrange multipliers (two constraints not included). Homework 8 on 14.7 due November 3.

Nov 4-8: Monday, Nov. 4: Midterm II.

15.1, 15.2. Integral of a function of two variables over a rectangle: the definition. Iterated integrals (over a rectangle). Fubini theorem (without proof). 15.3 Double integrals over general regions. Changing the order of integration. A summary of integration techniques from Math 101.

Homework 9 on 14.8 and 15.1 due November 10.

**Nov. 11-15:** 15.4 Double integrals in polar coordinates. Additional reading: 10.3 ("Polar coordinates"; in the old edition it is 11.3) in addition to 15.4. 15.5 Applications of double integrals: moments, centre of mass, moment of inertia. Probability not included.

Homework 10 on 15.3-15.4 due November 17.

Nov. 19-23: 15.7 Triple integrals. Six different ways of writing a triple integral as an iterated integral. Applications. (This is section 16.6 in the old edition). 15.8 Triple integrals in cylindrical coordinates (this is 16.7 in the old edition!).

Homework 11 on 15.5 and beginning of 15.7 due on November 24.

The last week: Triple integrals in spherical coordinates (section 15.9 in the new edition; 16.8 in the old edition!); review. The last webwork is due after the end of classes, depending on the date of the final exam.