MATH 253: MULTIVARIABLE CALCULUS

May 12 - June 18, 2020

- Section 921
Instructor: Dr. Samer Dweik
Time: Tuesday, Thursday, Friday 10:00 AM-12:00 AM and Wednesday 10:00 AM-11:00 AM
Place: Collaborate Ultra "Math 253 921"
E-mail: dweik@math.ubc.ca
Office Hours: right after class

- Section 922
Instructor: Dr. Shen-Ning Tung
Time: Tuesday, Thursday, Friday 8:00 AM-10:00 AM and Wednesday 8:00 AM-9:00 AM
Place: Zoom (see "Math 253 922" for further information)
E-mail: tung@math.ubc.ca
Office Hours: TBA

Topics: This is a course on Multivariable Calculus. General topics to be studied are: vectors, curves and surfaces, partial derivatives, maxima and minima, and multiple integrals.

Textbooks: The main text for this course is CLP-3 Multivariable Calculus by Joel Feldman and Andrew Rechnitzer. It is freely available from the website *http://www.math.ubc.ca/ CLP/CLP3/*. There will be suggested practice problems from the book and other sources which will not be collected or marked for credit. You are encouraged to do lots of problems, this is the best way to learn the subject.

Exams and Marking: Course mark will be based on the Webworks (20%), a midterm test (30%), and a final exam (50%).
Midterm: May 28.
Final exam: A precise date will come later.

Homeworks:
- On Canvas, you will have two different pages for this course: "Math 253 ALL" and "Math 253 921" or "Math 253 922". The common page "Math 253 ALL" will have the links to webworks, piazza, and some course-wide announcements.
- Homework assignments should be submitted online through Webwork. To access Webwork, log into Canvas, go to the "Math 253 ALL" page, and click on "assignments" on the left. You should see only one item "Webwork link". Click on that link; it should open Webwork in a separate window. Then work with Webwork as usual.
- Please use Piazza as the main resource for help with webwork-related and other questions. It is a forum, which will be monitored by my TA, where you can post questions and answers about webwork. Please use the "e-mail instructor" button in webwork *only* if the questions not answered on Piazza, and you posted it and did not receive an answer.

Course outline:
Please note that this is only an approximate outline; it may be updated as the course progresses.
- May 12-15: Two & three dimensional coordinate systems, distance between points, vectors, basic operations with vectors, length of a vector, unit vector, dot product, using dot product to find angle between lines, projection of a vector to another one, cross product, using cross product to find the area of a parallelogram, using dot and cross products to find the volume of a parallelepiped...
- May 19-22: Parametric and symmetric equations of lines, distance from point to line, equations of planes, angle between two planes, distance from point to plane, distances between lines or planes, curves: tangent vectors and length, quadric surfaces...

- May 26-29: Functions of several variables, domain, range, level curves, level surfaces, limits, continuity, partial derivatives, directional derivatives, tangent planes, linear approximations, higher-order partial derivatives, chain rule, implicit differentiation, tangent planes to surfaces.
- June 2-5: Maximum and minimum values, Lagrange multipliers.
- June 9-12: Double integrals: iterated integrals (Fubini theorem), double integrals in polar coordinates, surface area.
- June 16-18: Triple integrals: iterated integrals, Triple integrals in cylindrical and spherical coordinates.

Webworks:
- May 12-15: Homework 1 due.
- May 19-22: Homework 2 due.
- May 26-29: Homework 3 due.
- June 2-5: Homework 4 due.
- June 9-12: Homework 5 due.
- June 16-18: Homework 6 due.

Policies:
- There will be no make-up midterm test. Students with concessions (e.g. for illness or family emergencies) will have the weight of the midterm transferred to the final exam.
- No late homework will be accepted. Webwork will generally close at 11:59 pm on the specified date (please look at the dates carefully). For most problems, you will have an unlimited number of attempts and will not be penalized for incorrect attempts, so you can continue to work until you have it correct.
- 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.
- UBC takes cheating incidents very seriously. After due investigation, students found guilty of cheating on tests and examinations are usually given a final grade of 0 in the course and suspended from UBC for one year. Note that academic misconduct includes misrepresenting a medical excuse or other personal situation for the purposes of postponing an examination or quiz or otherwise obtaining an academic concession.