MATH 180: DIFFERENTIAL CALCULUS
Course outline for section 101

BASICS

All announcements, homework assignments and additional resources will be posted on the Canvas course page.

The teaching team and types of teaching. This course is taught by a team of faculty, graduate and undergraduate instructors. Contact information for the teaching team will be posted on the Canvas course page.

Most weeks will include the following classes.

1. One 80-minute *lecture*, taught by the faculty instructor. The lecture will establish the main results and introduce the theoretical framework of the week.

2. Two 50-minute *small classes*, taught by the small class instructors. In small classes, you will learn new material that is related but not equivalent to the material introduced in the lecture.

3. One 20-minute *quiz*. You will write quizzes based on whether your student number is even or odd.

Attendance is mandatory, and may be checked. In your lectures, and especially in your small classes, you are required to participate actively — to ask questions, propose solutions and extend results.

Textbook. There are a number of free online textbooks which are suitable for this course. The best is the CLP textbook, written by the UBC mathematicians Joel Feldman, Andrew Rechnitzer and Elyse Yeager. There is a link to this textbook in the "Additional resources" section of the Canvas course page.

Piazza. Piazza is an online forum where you are encouraged to post and respond to questions. If you ask a question about homework, you must indicate what work you have already done, and where you think you have gone wrong. If you respond to a question, you may not give away the answer. Bonus marks may be given for especially insightful questions and responses.

There is a link to Piazza on the Canvas course page.

Office hours. Office hours provide you with opportunities to ask questions about course material or mathematics in general. Office hours will take place 2:00-4:00 on Fridays in MATH 204. You are also welcome to book appointments over email with the faculty instructor.

Tips for success. This course is difficult but doable. Students who put effort into this course are rewarded not only in this course, but in both mathematics and non-mathematics courses in upper years. Here are some tips for success.

Put in the time and effort. Mathematics is not easy, but it is doable, and it is transparent: you learn by doing, and the more you do, the better you will get. The expectation is that you spend at least eight hours per week outside the classroom on this course. No matter who you are, or what your prior abilities are, this time will pay off.

Keep up. For six days a week, schedule some time to work on math. Don't fall behind. If you are struggling with some material, make sure to seek help, either from your classmates or from me. However...

Don't be too hard on yourself. ...realize that some struggle is good and necessary. Learning mathematics, like learning anything else worthwhile, can be frustrating. Failing to get something on the first, or second, or even the third try is completely normal! Your aim should be progress, not attainment.

Work together. You are encouraged to work on all assignments together. However, you must write your solutions independently.

SCHEDULE

Important information is contained in the course calendar, which is available on the Canvas course page. This is a very important document. Download a copy and display it prominently.

You will write quizzes based on whether your student number is even or odd. If your student number is even, write the quizzes shown in red. If your student number is odd, write the quizzes shown in blue.

Lectures and quizzes take place in CIRS 1250. Small classes take place in the rooms indicated on the Student Service Centre at

courses.students.ubc.ca.

An approximate schedule of topics is below.

Dates	Topics
Sept. 3 - 16	Limits, asymptotes and the derivative
Sept. 17 - 23	Derivatives of sums, products and quotients
Sept. 24 - 30	Derivatives of trigonometric functions
Oct. 1 - 7	Derivatives of exponential and logarithmic functions
Oct. 8 - 21	The Chain Rule, implicit differentiation, related rates and inverse trig functions
Oct. 22 - Nov. 4	Curve sketching
Nov. 5 - 18	Optimization
Nov. 19 - 29	Linear and higher degree approximations

ASSESSMENTS

To achieve success in this course, assigned work is necessary but not sufficient. You must work through extra problems, some of which will be provided to you. *The expectation is that you spend at least eight hours per week outside the classroom on this course.*

Assignments. There are eight assignments, each with an online part and a written part. Both parts may be accessed through the Canvas course page.

Online part. The online problems are on the WeBWorK platform. They develop your technical and computational skills. They generally consist of 30 problems. They are graded out of 20, so that you have 10 "free problems" of your choice that you need not complete. However, it is strongly encouraged that you complete all 30 problems.

Written part. The written problems develop your ability to synthesize information and construct arguments. Your answers should be in the form of explanations written in plain English with mathematical notations. You will be graded on the mathematical, logical and grammatical coherence of your explanations, as well as on their economy and creativity. The written problems will generally be at a much higher level than the online problems; it is not unusual to spend several days working on them. Late assignments will not be accepted. *You are encouraged to work on homework assignments together. However, you must write your solutions independently.*

You are required to type solutions to your written assignments. It is strongly recommended that you use LaTeX, a document preparation system widely used in mathematics and the sciences. The course webpage has a link to a free online LaTeX compiler.

Quizzes. There are eight 20-minute quizzes meant to assess your technical and computational skills. The questions on quizzes are similar to WeBWorK problems.

Quizzes are indicated in bold on the course schedule document. They take place in CIRS 1250. You will write quizzes based on whether your student number is even or odd. However, quizzes will be posted on the Canvas course page, and all students are responsible for all material assessed on quizzes. Calculators are not permitted on quizzes.

Tests and exams. There will be one 90-minute midterm test on October 15. The 150-minute final exam will take place in December. Calculators are not permitted on tests and exams.

Grade summary. Your final grade is based on assignments (20%), quizzes (10%), the midterm exam (20%) and the final exam (50%).