Acknowledgement

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xʷməθkʷəy̓əm (Musqueam) people. The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on in their culture, history, and traditions from one generation to the next on this site.

Course Information

Course Title	Number & Section	Room	Time	Credit Value
Differential calculus with applications to physical sciences and engineering	MATH 100 V02	If in person, MATH 104. Otherwise on zoom via Canvas	Tuesday and Thursday from 8:00am to 9:30am	3

First day of teaching: Jan 10; Last day of teaching: Apr 08.
Reading week: Feb 21-25.

Course Instructor	Contact Details	Office Hours
Mihai Marian, Instructor	By email: mihmar@math.ubc.ca	By appointment; regular office hours will be scheduled after week 2.

Prerequisites

High-school calculus and a score of 80% or higher in BC Principles of Mathematics 12 or Pre-calculus 12.

Special Health Recommendation

Everyone is expected to follow federal, provincial and UBC's rules and recommendations at all times.

Wearing a mask covering nose and mouth in classrooms, tutorial sessions, the math learning centre, and building hallways is mandatory. Students are asked not to eat or drink during classes. Anyone who cannot wear a mask should tell their instructor immediately.

Any student experiencing symptoms of Covid-19 is asked to self-isolate at home. The course material will be distributed online.

If you are sick on a quiz day, do not attend the class and please e-mail the instructor as soon as you are confident you should not come to the scheduled quiz.

If you are sick on a final exam day, do not attend the exam. You must apply for deferred standing (an academic concession) through Science Advising no later than 48 hours after the missed final exam/assignment.

Course Structure & Learning Outcomes

The structure will consist of two weekly lectures, as well as weekly assignments, which are an essential part of the course. Students will learn the basics of differential calculus. This includes the notion of limit and derivative, methods of computation, especially for elementary functions, the interpretation of the derivative, and its applications.

To prepare for the lectures, students will also be given short reading assignments in the free online CLP textbook. Millions of students in thousands of schools study calculus each year, so it is not surprising that there is an immense amount of resources. Students are encouraged to use any resource they find useful, but to be very careful not to drown in the ocean of online videos and lecture notes. It is impossible to learn math without thinking hard and working hard; this is why it is expected that students work independently at least 2 hours for every hour of lecture; this should amount to 6 hours per week.

Schedule of Topics

The sections below refer to the CLP textbook. The precise schedule is subject to small changes.

- Week 1: Sets & Functions; Limits. 0.3-0.4, 1.1-1.3
- Week 2: Computation techniques; Limits at infinity; Continuity. 1.4-1.6
- Week 3: More on continuity; The derivative. 1.6, 2.1-2.3
- Week 4: Computing derivatives; Chain Rule, trigonometric functions. 2.4, 2.9, 2.6, 2.8
- Week 5: Exponential growth and decay; Differential Equations. 2.7, 3.3.
- Week 6: Inverse functions, the logarithm. 2.9-2.10
- *Week 7: Reading week.*
- Week 8: Implicit differentiation; Inverse trigonometric functions; Rates. 2.11-2.12, 3.1
- Week 9: Related rates; Mean value theorem. 3.2, 2.13
- Week 10: Linear approximation. Taylor polynomials, approximations. 3.4.
- Week 11: Optimisation. 3.5
- Week 12: Increasing/decreasing functions, convex/concave functions. Sketching graphs. 3.6
- Week 13: Indeterminate forms and l'Hôpital's rule; Review. 3.7

Learning Materials

We will rely on the free online CLP textbook.

The weekly homework assignments will be in online format, with a link posted on Canvas. The quizzes will be 25 minutes long and done in class.

Examinable material in this course will consist of all topics presented in the lectures or in homework problems.

Assessments of Learning

There will be

1. weekly homework assignments due at the end of the day Thursdays at 11:59pm,
2. quizzes taking place in class every two weeks on Tuesdays at the beginning of class
3. one comprehensive final exam to be scheduled in the exam period

Cheating will not be tolerated.

All students must have their UBC student's ID card visible in front of them during all exams.

Final Grade:

The final grade is computed as such:

Homework: 25%; Quizzes: 20%; Final: 50%; Participation: 5%.

Students will have the possibility to improve the grade of a quiz by demonstrating that they learned from their mistake and are able to solve similar problems to the one they got wrong on the quiz; this is fully at the discretion of the instructor and the details will be decided later in the term. Students should not ask the instructor for ways to improve their grade. They will not be able to make up more than half of the marks they lost on a quiz.

That being said, there will be no make-up quizzes. Missing a quiz for a valid reason in the weight of that quiz being transferred to the rest of the quizzes. Examples of valid reasons include illness and travel to play a scheduled game for a varsity team. Examples of reasons that are not valid include conflicts with personal travel schedules or conflicts with work schedules. Any student who misses a test is to present to their instructor the Department of Mathematics self-declaration form for reporting a missed assessment within 72 hours of the midterm date. This form can used at most once in the term. Should there be a request for additional accommodation, the student should contact their advising office.

A student must finish a significant amount of term work in order to pass the course.

In the case of the final exam, the students should contact the Department of Mathematics and the missed final will be handled in a formal way.

On submitted work:

All assertions require an argument unless the problem states otherwise. No matter the operative word ('find', 'solve', 'establish', 'calculate', 'determine',...), you must justify your answer.
Written work should be presented carefully, in complete English sentences, and with sufficient detail. A correct sequence of formulae will only receive partial credit, an unstructured cloud of formulae and incoherent text will receive none.

University Policies

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available on the UBC Senate website.

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