

Course Outline Math 190: Calculus Survey Fall, 2022

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Course Description: This is a 4-credit course designed to equip students in the Faculty of Forestry with quantitative skills through the knowledge of calculus. The course will start with a review of functions (such as function composition), continue with the elements of Differential Calculus, covering derivatives, techniques for finding derivatives, and related rates. After the midterm, we will cover Riemann sums, indefinite and definite integrals. Necessary precalculus concepts (such as trigonometry) will be reviewed as the course progresses.

Labs : This course comes with a weekly mandatory Lab meetings. Each student should register with one of the lab sections. The purpose of the labs is to reinforce your understanding of the subject through TA-driven examples, and ask questions about the course content. The lab also provides a medium to work in groups, and opportunity to collaborate effectively with other students. Each lab will be accompanied with two TAs.

Text Books: The textbook for this course is CLP-1 Differential Calculus textbook and CLP-2 Integral Calculus textbook by Joel Feldman, Andrew Rechnitzer and Elyse Yeager, and the links for thes online textbooks are

<https://personal.math.ubc.ca/CLP/CLP1/>
<https://personal.math.ubc.ca/CLP/CLP2/>

Topics: Students are expected to learn the following topics. The list is not exhaustive, but rather contains the essential topics necessary to succeed in the course.

1. Functions (CLP 1 Section 0.4)
2. The limit of a function (CLP 1 Section 1.3)
3. Calculating limits with limit laws (CLP 1 Section 1.4)
4. Derivatives (CLP 1 Sections 2.2, 2.3)
5. Rules for derivatives, (CLP 1 Sections 2.4, 2.6, 2.7, 2.8, 2.9, 2.10)
6. Related rates (CLP 1 Section 3.2)

7. Introduction to antiderivatives (CLP 1 Section 4.1)
8. Riemann sums and definite integrals (CLP 2 Section 1.1)
9. Basic properties of definite integrals (CLP 2 Section 1.2)
10. Fundamental theorem of calculus (CLP 2 Section 1.3)
11. Substitution and integration by parts (CLP 2 Sections 1.4, 1.7)
12. Area between curves (CLP 2 Section 1.5)

Course Structure: Lectures and labs Participation in class is highly recommended. While no formal attendance will be taken, you are strongly encouraged to come to every lecture. Furthermore, there will be in-class midterm examinations, so you need to be present in class to take them. Participation in labs is mandatory.

Grading Scheme: Your final grade will count the assessments using the following proportions:

- 10% of your grade will be determined by labs (attendance and participation).
- 20% of your grade will be determined by the Midterm 1.
- 20% of your grade will be determined by the Midterm 2.
- 50% of your grade will be determined by the Final Exam.

No make-up midterm examination will be given. Non-attendance at an exam will result in a mark of zero being recorded. Unavoidable, documented medical emergencies are the only exception to this policy.

Midterm Exam Dates: There will be two in-class midterm exams. The date and the location for the final exam will be determined later.

Midterm Examination 1: October 7 (Fri).

Midterm Examination 2: November 11 (Fri).

Considerate Behavior and Cheating: Talking in class is disruptive to others trying to concentrate on the lecture. Violators may be asked to sit separately or leave the class. Cheating on tests will not be tolerated. Any cheating will immediately be reported the head of the Mathematics Department for disciplinary action. Cheaters are often caught and the usual punishment is a 0 in the course, expulsion from the University for 1 year, no transferability for courses taken at another institution while under suspension and a notation on your transcript of the suspension due to cheating. Finally, it is considered inappropriate in any course to bring friends or other students not registered in the course into the lectures without first obtaining permission of the instructor.

Suggested problems You are strongly advised to work out the following suggested problems in detail. These are not to be turned in, but they will give you practice in the techniques learned in class and provide valuable assistance in preparing for the exams.

- **Exercises in CLP 1 Section 1.3.2** : 1, 2, 3, 6, 7, 8, 9, 10, 13, 14.
- **Exercises in CLP 1 Section 1.4.2**: 6, 7, 8, 10, 12, 15, 16, 17, 20, 24, 38, 49.
- **Exercises in CLP 1 Section 2.2.4**: 6, 8, 9, 10, 12, 13, 25.
- **Exercises in CLP 1 Section 2.3.3**: 1, 2, 3, 4, 5.
- **Exercises in CLP 1 Section 2.4.2**: 1, 2, 3, 5, 7, 9, 11, 14, 16.
- **Exercises in CLP 1 Section 2.6.2**: 1, 2, 5, 6, 7, 8, 19.
- **Exercises in CLP 1 Section 2.7.3**: 1, 3, 5, 11, 12.
- **Exercises in CLP 1 Section 2.8.8**: 3, 4, 6, 7, 8, 9, 17.
- **Exercises in CLP 1 Section 2.9.4**: 3, 4, 5, 6, 7, 8, 16, 26.
- **Exercises in CLP 1 Section 2.10.3**: 4, 6, 9, 10, 13, 17, 18.
- **Exercises in CLP 1 Section 3.2.2**: 2, 5, 6, 7.
- **Exercises in CLP 1 Section 4.1.2**: 3, 4, 5, 13, 15
- **Exercises in CLP 2 Section 1.1.8**: 4, 6, 9, 18, 21.
- **Exercises in CLP 2 Section 1.2.3**: 5, 6, 7, 9.
- **Exercises in CLP 2 Section 1.3.2**: 1, 4, 5, 6, 7, 8, 10, 12, 20, 21, 30, 34.
- **Exercises in CLP 2 Section 1.4.2**: 1, 2, 7, 8, 9, 10, 11, 13.
- **Exercises in CLP 2 Section 1.7.2**: 6, 7, 8, 9, 10, 11.
- **Exercises in CLP 2 Section 1.5.2**: 3, 4, 7, 8, 11, 15,