

# MATH 1215 - Calculus for the Life and Social Sciences

## 1 Course Outline

**Course Description/Objectives:** MATH 1215 is designed to provide the basic mathematical tools required for the life and social sciences. All of the main topics from differential and integral calculus will be covered (including derivatives, techniques of differentiation, logarithmic and exponential functions, optimization, basic ordinary differential equations, integration, and techniques and applications of integration) and have an emphasis on modelling systems from the life and social sciences.

**Textbook:** Calculus for the Life Sciences: Modelling the dynamics of life, second Canadian edition by Fredrick Adler and Miroslav Lorvić.

**Prerequisites:** Nova Scotia Mathematics 11 and 12 or pre-calculus is highly recommended.

## 2 General Information

### Section 1

**Instructor** Dr. Sarah Chisholm

**Times** TR 8:35 – 9:55am

+ F 9:35 – 10:25am or F 13:35 – 14:25pm

**Locations** LSC-PSYCHOLOGY P5260 (TR) and LSC-COMMON AREA C338 (F)

**Office hours** Mondays 1-2pm, Tuesdays 12-1pm, Thursdays 12-1pm

**Office** Chase 122

## 3 Evaluation and Grading

**Weekly Quizzes** Each week there will be an online quiz found on the course webpage. The problems will be based on class content and suggested textbook problems.

**Projects** There will be two projects during the semester where you will have the opportunity to work out an application of the theory in this course to a real-life situation. You will generally have two weeks to complete each project. You will work on the projects in groups of 2 or 3. Your group will hand in one assignment with all names clearly labelled.

**Midterm Test** The midterm test will be held on Tuesday, March 5, from 8:35-9:55am (in class).

**Final Exam** The final exam will be 3 hours long. The date and time for this exam is set by the registrar during the official Dalhousie exam period from April 10 until April 26, 2019. If you plan to depart from campus at the end of the semester, please buy your airline tickets after the registrar has announced the exam schedule, or plan to leave after April 26. There will not be any opportunities to write the exam early.

**Course score:** Weekly Quizzes 15% + Projects 20% + Midterm Test 25% + Final Exam 40%

## 4 Grading Scheme

The grading scheme for this course will follow the standard scale set by Dalhousie University.

## 5 Important Dates

**January 17** Project 1 is available

**January 31** Project 1 is due

**March 5** Midterm Test

**March 14** Project 2 is available

**March 28** Project 2 is due

**April 10-26** Exam period

## 6 Calculators

Calculators are not permitted during the midterm and final exam. Answers may be left in unsimplified form.

## 7 Course Topics and Approximate Dates

- week 1** Discrete dynamical systems, Catalogue of Functions - sections 3.1-3.4, 1.3
- week 2** Rates of change, Limits, Exponential Functions - sections 4.1-4.3, 2.2
- week 3** Continuity, Differentiation, Logarithmic Functions - sections 4.4-4.5, 2.2
- week 4** More derivatives - sections 5.1-5.3
- week 5** Trig. derivatives, Implicit derivatives, Related Rates, Trig. Functions - sections 5.4, 5.5, 2.3
- week 6** Second derivatives, Linear Approximation, Max/Min, Midterm Exam Review - sections 5.6, 5.7, 6.1
- week 7** Taylor Polynomials, l'Hôpital's rule - sections 5.7, 6.4
- week 8** Graphing, Equilibria & derivatives, Differential equations - sections 6.5, 6.7, 7.1
- week 9** Logistic Equation, Euler's Method, Antiderivatives - sections 6.7-6.8, 7.1-7.2
- week 10** Definite Integrals, Riemann Sums, FTC, Substitution - section 7.3-7.5
- week 11** Autonomous Differential Equations, Integration by Parts - sections 8.1-8.3, 7.5
- week 12** Separable Differential Equations, Final Exam Review - section 8.4

## 8 Student Accommodations

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic under the Nova Scotia Human Rights Act. Students who require academic accommodation for either classroom participation or the writing of tests, quizzes and exams should make their request to the Office of Student Accessibility & Accommodation (OSAA) prior to or at the outset of each academic term. Please visit

[https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.html)

for more information and to obtain Form A - Request for Accommodation. A note taker may be required to assist a classmate. There is an honorarium provided for the note taker of \$75-100/course/term. If you are interested, please contact OSAA at 494-2836 for more information.

## 9 Final Notes

- In the event that you are absent for three days or fewer resulting in missed or late academic requirements, you will be required to submit a Student Declaration of Absence Form to your instructor, found here:

[https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/academic-policies/student-absence.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/academic-policies/student-absence.html)

- The university policy states that all cases of academic misconduct must be handled through official channels. The instructional staff has no latitude in this matter. Please read the paragraphs on academic honesty on page 66-69 in the Calendar.

[https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/academiccalendar/Undergraduate\\_2018-2019.pdf](https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/academiccalendar/Undergraduate_2018-2019.pdf)

- Transitions are challenging. Students moving from high school to university experience high levels of stress especially in terms of their studies. The Writing Centre, works to develop writing skills that meet university expectations in one-on-one sessions, in small groups, and in classes. Their url is

[https://www.dal.ca/campus\\_life/academic-support/writing-and-study-skills.html](https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html)

Tutoring information and academic skills program information may be found at

[https://www.dal.ca/campus\\_life/academic-support/study-skills-and-tutoring.html](https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html)