Differential & Integral Calculus II Syllabus

Department of Mathematics & Statistics

MATH 1010, Fall 2023

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Course Instructor(s)

Name	Email	Office Hours
Karl Dilcher	karl.dilcher@dal.ca	T, F, 2:30-3:30, Chase 325 Thurs. 8-9 pm, Online

Course Description (Calendar Entry)

A continuation of the study of calculus, with topics including: Riemann sums, techniques of integration, elementary differential equations and applications, parametric equations and polar coordinates, sequences and series and Taylor series. (Note: elementary differential equations will *not* be covered).

Course Prerequisites

MATH100.03, or MATH 1215.03 with a grade of B or better.

Student Resources

The MATH/STAT Learning Centre is located in Chase 119 and will be operating in-person and remotely. It opens on Sept. 5 and support is available Monday through Friday from 11:30am - 4:30pm and Monday through Friday evenings from 6:30-7:30pm, until Dec. 19. Register for the Brightspace ``course"
at https://www.dal.ca/faculty/science/math-stats/about/learning-centre.html

Course Structure

Course Delivery

In person only. Classes will not be recorded.

Lectures

Mondays, Wednesdays, Fridays 1:35—2:25 pm, LSC P5260 (Psychology Wing).

Tutorials

- Tutorials begin in the second week of classes, the week of September 11.
- If one or more tutorials are canceled (for instance due to a holiday), then there will be no tutorials that week.

Tutorial	Time	Place
T 01	Wednesday, 2:35-3:25 pm	McCain 2021
T 02	Monday, 2:35-3:25 pm	Henry Hicks 217
T 03	Monday, 2:35-3:25 pm	LSC C234

Course Materials

- Textbook: Single Variable Calculus - Early Transcendentals, Ninth Edition, by James Stewart, Daniel K. Clegg and Saleem Watson. (A recent older edition, for instance the 7^{th} or 8^{th}, will be acceptable).
- This course has a strong and important presence on Brightspace.
- Course Notes (by Dr. Rob Noble): A summary of the textbook sections you are required to study. The notes are available under **Content** on Brightspace.
- Your online assignments will appear in **Webwork**, accessed through links appearing under **Content** in BrightSpace.

Assessment

Component	Weight (% of final grade)	Date
Tutorial Quizzes	5%	Weekly
Online Assignments	20%	About 3 per week
Midterm	25%	October 30, 6:30-8:30 pm
Final Exam	50%	(Scheduled by Registrar)

Note: If your final exam grade is higher than your midterm grade, then the final exam counts 75%. However, **the midterm must be written in any case**. It is important that you study continuously throughout the term. In mathematics **you cannot just "cram"** for a final exam and be successful.

Conversion of numerical grades to final letter grades follows the Dalhousie Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies on Missed or Late Academic Requirements

- Missed quizzes or exams can be made up for documented illness or upon receipt of equivalent proof of inability to write at the scheduled time.
- Calculators will **not** be allowed during tutorial quizzes, the midterm or the final examination. Only writing utensils (pencils, lead, erasers, pens, white-out) will be allowed.
- Information about the course may be given during class. It is the responsibility of students to make sure that they are made aware of what occurs during class.

Course Policies related to Academic Integrity

- Students are allowed to work together on the online assignments. However, **you cannot succeed** in this course unless you **put in your own** substantial time and effort.
- No collaboration is permitted on quizzes and exams.
- In general, this course is covered by university regulations concerning academic integrity. Please see the relevant section below.

Learning Objectives

- Understand the significance and various methods of evaluation of integrals.
- Understand how to utilize parametric representations of plane curves.
- Be able to compute areas and arc lengths associated with general parametric curves and specifically for curves defined by both cartesian and polar coordinates.
- Understand the significance of sequences, series and their associated convergence behaviour.
- Understand power series as well as the extent to which functions can be represented by Taylor/MacLaurin series.

This course is **the most important prerequisite** for numerous other mathematics courses, as well as for many courses in Statistics, Physics, Chemistry, as well as other sciences.

Course Content

The numbering refers to Dr. Noble's notes and agrees with the sections in the textbook. Not all material in each section will be covered. *The schedule is approximate* and may somewhat change according to time requirements.

Date	Topic
September 6, 8	5.4 Indefinite Integrals & the net change theorem 5.5 The substitution rule
September 11, 13, 15	6.1 Areas between curves 7.1 Integration by parts
September 18, 20, 22	7.2 Trigonometric integrals 7.3 Trigonometric substitution
September 25, 27, 29	7.4 Integration by partial fractions 7.5 Strategy for integration
October 2	**National Day of Truth & Reconciliation** **University is closed**
October 4	**Last Day to Drop without a "W"**
October 4, 6	7.8 Improper integrals 8.1 Arc length
October 9	**Thanksgiving Day. University is closed**
October 11, 13	10.1 Curves defined by parametric equations 10.2 Calculus with parametric curves
October 16, 18, 20	10.3 Polar Coordinates 10.4 Areas and lengths in polar coordinates
October 23, 25, 27	11.1 Sequences 11.2 Series
October 30	**Midterm Exam, 6:30-8:30 pm, LSC P5260**
October 30, Nov. 1, 3	11.3 The integral test and estimates of sums 11.4 The comparison test
November 2	**Last Day to Drop with a "W"**
November 6, 8, 10	11.5 Alternating series 11.6 Absolute convergence; the ratio & root tests
November 13-17	**Study break; no classes or tutorials**
November 20, 22, 24	11.7 Strategies for testing series 11.8 Power series
November 27, 29, December 1	11.9 Representation of functions as power series 11.10 Taylor and Maclaurin Series
December 4, **5,** 6 *Note: class on Tues.*	7.7. Approximate integration (only if time allows) Time for catch-up (if needed) General review

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: https://www.dal.ca/about-dal/internationalization.html

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html)

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: http://www.dal.ca/cultureofrespect.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at:
https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.