

Faculty of Science Course Syllabus

Department of Mathematics and Statistics

Math 1000 – Differential & Integral Calculus I

Winter 2018

Instructor

| Instructor | E-mail Address | Office Location | Office Hours |
|--------------|--|-----------------|----------------|
| Karl Dilcher | dilcher@mathstat.dal.ca | CHASE 325 | MWF 10 – 11 AM |

Lectures

| Days | Time | Location |
|------|-------------------|---------------|
| MWF | 8:35 AM – 9:25 AM | CHEMISTRY 125 |

Tutorials

1 hour per week, **beginning the week of January 15, 2018.**

| Tutorial Section | Days | Time | Location |
|------------------|------------|--------------------|----------|
| 1 | Mondays | 9:35 AM – 10:25 AM | LSC 240 |
| 2 | Wednesdays | 9:35 AM – 10:25 AM | LSC 240 |
| 3 | Thursdays | 8:35 AM – 9:25 AM | LSC 236 |

Course Description

This course offers a self-contained introduction to differential and integral calculus. The topics include functions, limits, differentiation of polynomial, trigonometric, exponential and logarithmic functions, product, quotient and chain rules, applications of differentiation, antiderivatives and definite integrals, integration by substitution. A sequel to this course is MATH 1010.03.

Course Prerequisites

Nova Scotia Mathematics advanced 11 and 12 or pre-calculus. Pre-calculus is highly recommended.

Course Objectives/Learning Outcomes

- Understand the significance of limits, continuity, differentiability and integrability of functions.
- Understand the connection between differentiation and integration given by the Fundamental Theorem of Calculus.
- Understand the significance of the Intermediate Value Theorem as well as the Mean Value Theorem / Rolle's Theorem.
- Be able to sketch a reasonably accurate graph of a given function by hand, using calculus.
- Be able to use calculus to solve optimization and related rates problems.
- Be able to compute derivatives as well as basic integrals.

Course Materials

- Textbook: Single Variable Calculus – Early Transcendentals, Eighth Edition, by James Stewart. This textbook will also be used in Math 1010.
- Brightspace: This course has a major presence on Brightspace. To access your Math 1000 course on Brightspace you may login to: <https://dal.brightspace.com/d21/login>. Alternatively, you can select the OWL link that appears on the Dalhousie homepage (<http://www.dal.ca>). It is important that you familiarize yourself with the systems requirement for proper access to Brightspace.

You will need at various times to gain information from different areas of Brightspace. Most importantly:

1. The course outline as well as links to the online assignments can be found under **Content**.
 2. Your grades can be found under **Assessments**.
- Webwork: Your online assignments will appear in webwork, accessed through links appearing under **Content** in BrightSpace.

Resources

The Mathematics & Statistics Learning Centre (Room 119, off the main lobby of the Chase Building). A calculus tutor will be available on weekdays on a first come, first served basis, free of charge. There are large tables where you can work together (on Math or Stats only, please). To see the current schedule, please visit the Learning Centre's webpage <http://www.dal.ca/faculty/science/math-stats/about/learning-centre.html>.

Course Assessment

The Final Grade will be computed as the maximum of the grades obtained from the following two schemes:

Scheme I:

| Component | Weight (% of final grade) | Date |
|--------------------|---------------------------|--------------------------|
| Tutorial Quizzes | 15% | Weekly |
| Online Assignments | 15% | 2 or 3 per week |
| Midterm Exam | 25% | February 28 |
| Final Exam | 45% | (Scheduled by Registrar) |

Scheme II:

| Component | Weight (% of final grade) | Date |
|--------------------|---------------------------|--------------------------|
| Tutorial Quizzes | 15% | Weekly |
| Online Assignments | 15% | 2 or 3 per week |
| Final Exam | 70% | (Scheduled by Registrar) |

Note: It is strongly recommended that you prepare yourself to be graded on the first scheme; the second scheme is included in order to accommodate students who fail to perform up to their ability on the midterm due to circumstances beyond their control.

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

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

Course Policies

- 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. In fact, only writing utensils (pencils, erasers, pens, white-out) will be allowed.
- Information about the course may be given during class. It is your, the student's, responsibility to make sure that you are aware of what occurs during classes.
- Please refrain from using your smartphone during class. The main reasons are:
 - It is distracting to those sitting near you.
 - Concentration is absolutely essential in mathematics.
 - Consider your classes (not just this one) as opportunities to practice concentrating on just one task.
 Thank you for your consideration.

Course Content

The course material covers most of Chapters 2 – 5 of the textbook. Specifically, we will try to stick to the following lecture schedule:

| Dates | Topics | Sections |
|-------------------------|--|---------------|
| January 8 – 12 | Tangents, Velocity, Limits, Limit laws | 2.1, 2.2, 2.3 |
| January 15 – 19 | Continuity, Limits at infinity, The derivative | 2.5, 2.6, 2.7 |
| January 22 – 26 | Derivative of a function, Differentiation rules | 2.8, 3.1, 3.2 |
| January 29, 31 | Differentiation Rules (cont'd) | 3.3, 3.4 |
| February 2 | Munro Day – No class | |
| February 5 | Last day to drop without a “W” | |
| February 5 – 9 | Implicit differentiation, Derivatives of logarithmic functions | 3.5, 3.6 |
| February 12 – 16 | Rates of change, Exponential growth & decay, Related rates | 3.7, 3.8, 3.9 |
| February 19 – 23 | Study Break – No classes | |
| Feb. 26 – March 2 | Linear approximations, Max/Min problems | 3.10, 4.1 |
| February 28 | Midterm exam, 7–9 pm, Dunn 101 and 117 | |
| March 5 – 9 | Mean value theorem, Graphing | 4.2, 4.3 |
| March 12 | Last day to drop with a “W” | |
| March 12 – 16 | L'Hospital's rule, Graphing | 4.4, 4.5 |
| March 19 – 23 | Optimization problems, Antiderivatives | 4.7, 4.9 |
| March 26, 28 | Area under a curve, Definite integrals | 5.1, 5.2 |
| March 30 | Good Friday – No class | |
| April 2 – 6 | Fundamental theorem of calculus, Indefinite Integrals | 5.3, 5.4 |
| April 9, 10* | The Substitution Rule, Review | 5.5 |

*Note that the last class is on **Tuesday**, April 10.

University Policies and Statements

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of 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.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.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.

Code:

https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

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.

Statement: <http://www.dal.ca/cultureofrespect.html>

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 (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Missed or Late Academic Requirements due to Student Absence (policy)

https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

Student Resources and Support

Advising

General Advising: https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: <https://dsu.ca/dsas>

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Scent-Free Program

<https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>