

# CSCI 1300 - Calculus for Computer Science

Dalhousie University sits on  
the ancestral and unceded  
territory of the Mi'kmaq  
nation. We are all Treaty  
people

## Fall 2023 Course Syllabus

We acknowledge the histories,  
contributions, and legacies of  
the African Nova Scotian people  
and communities who have  
been here for over 400 years

### Course Delivery Details:

Lectures				
Section	Time	Location	Instructor	Email
1	MWF 11:35AM - 12:25PM	Chemistry 125	Dr. Kornell	akornell@dal.ca
2	MWF 9:35AM - 10:25AM	Dentistry 3156	Dr. DeGagné	DeGagne@dal.ca
Labs				
T01	M 4:05PM - 5:25PM	LSC C338	Head TA	Email
T02	M 4:05PM - 5:25PM	Dunn 304	Sherlock	br225405@dal.ca
T03	M 2:35PM - 3:55PM	LSC C338		
T04	M 2:35PM - 3:55PM	LSC C238		
T05	T 4:05PM - 5:25PM	LSC C338		

### Student Support:

#### Course Support:

Students are always welcome to ask their instructor questions about the course. This can be done by:

- Asking general questions on the Brightspace discussion forum
- Emailing private or personal questions to your instructor,
- Going to their instructor's office hours
  - Dr. Kornell's office hours will be held on Thursdays from 4:00PM - 5PM in Chase 252.
  - Dr. DeGagné's office hours will be held on Tuesdays from 1:00PM - 2:00PM in Goldberg 226 or via Collaborate Ultra.





**Learning Centre:**

The Faculty of Computer Science’s Learning Centre is located in Goldberg 233 and will be operating in-person and remotely. Support is available Monday through Friday except on University closures and unplanned Storm closures. You can find more information online on their Brightspace page <https://dal.brightspace.com/d2l/home/210118>

**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 [access@dal.ca](mailto:access@dal.ca) or 494-2836 for more information.



**Student Health and Wellness:**

Taking care of your health is important. As a Dalhousie student, you have access to a wide range of resources to support your health and wellbeing. Students looking to access physical or mental health & wellness services at Dalhousie can go to the Student Health & Wellness Centre in the LeMarchant Building. The team includes: registered nurses, doctors, counsellors and a social worker. Visit [dal.ca/studenthealth](https://dal.ca/studenthealth) to learn more and book an appointment today.

Students also have access to a variety of online mental health resources, including telephone/texting counselling and workshops/training programs. Learn more and access these resources at [dal.ca/mentalhealth](https://dal.ca/mentalhealth).

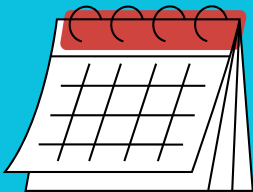


**Learning and Support Resources:**

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

# About the Course:

## Important Dates:



- September 19th: Last day to change and add classes
- September 28th: Module 1 Summative Test
- October 2nd: National Day for Truth and Reconciliation – No classes, No Tutorials
- October 4th: Last day to drop without a “W”
- October 9th: Thanksgiving – No classes, No Tutorials
- October 26th: Module 2 Summative Test
- November 2nd: Last day to drop with a “W”
- November 6th: Module 3 Summative Test
- November 13th - November 17th: Fall study break – No classes
- November 30th - Module 4 Summative Test
- December 6th - Module 5 Summative Test
- The exam schedule will be posted on October 1st. See [https://www.dal.ca/academics/exam\\_schedule.html](https://www.dal.ca/academics/exam_schedule.html)

## Course Description:

This course is an introduction to calculus with applications to computer science. Students will be exposed to examples from graphics, machine learning, robotics, simulation, and other areas of computer science. Topics covered will be single variable limits, derivatives, integrals, and differential equations.

**Prerequisites:** NS Mathematics Pre-Calculus  
(or equivalent)

**Exclusions:** MATH 1000

## Learning Outcomes

A student MUST demonstrate minimum competency in ALL learning outcomes.

- Describe areas or problems in computer science where calculus is used
- Compute limits of simple functions, including application of L'Hopital's rule.
- Interpret infinite limits and limits at infinity as asymptotes for a function.
- Compute the derivative of a univariate function: polynomials, exponentials, trigonometric, logarithmic.
- Apply the product, quotient, and chain rules to compute derivatives of simple functions.
- Use linear approximation and Taylor series to approximate single-variable functions.
- Compute the partial derivatives and gradient of simple multivariate functions.
- Compute the integral of a simple univariate function using antiderivatives, u-substitution, and integration by parts: polynomials, exponentials, trigonometric, logarithmic.
- Describe how integrals can be approximated and computed numerically.
- Describe the purpose and mechanics of a simple ordinary differential equation.
- Numerically solve ordinary differential equations using Euler's method.

### Class Format:

Though this course has multiple sections, and both sections may have different teaching styles, all students will have access to all parts of the course. That is, students registered in section 1 can still access all of the online material from section 2 (section 1 will be a more traditional teaching style, and section 2 will be a flipped classroom teaching style). Students may attend either lecture as long as there are seats available (priority will be given to students registered in their respective sections). Regardless of which section a student is registered in, all tutorials and tests will be held in-person and will be identical.



### Class Content Outline and Dates

Dates	Module
Sept. 6 <sup>th</sup>	Orientation and Foundations
Sept. 8 <sup>th</sup> to Sept. 15 <sup>th</sup>	Module 1: Limits
Sept. 11 <sup>th</sup>	Tutorials Start
Sept. 15 <sup>th</sup>	Module 1 Formative Assignment Due
Sept. 18 <sup>th</sup> to Oct. 6 <sup>th</sup>	Module 2: Derivatives
Sept. 19 <sup>th</sup>	Last Day to Change and Add Classes
Sept. 27 <sup>th</sup>	No Lecture In Lieu of Module 1 Test
Sept. 28 <sup>th</sup>	Module 1 Summative Test (15%).
Oct. 2 <sup>nd</sup>	National Day for Truth and Reconciliation – No Class
Oct 2 <sup>nd</sup> – 3 <sup>rd</sup>	No Tutorials
Oct. 4 <sup>rd</sup>	Last Day to Drop without a W
Oct. 12 <sup>th</sup>	Module 2 Formative Assignment Due
Oct. 9 <sup>th</sup>	Thanksgiving – No Class
Oct 9 <sup>th</sup> – 10 <sup>th</sup>	No Tutorials
Oct. 11 <sup>th</sup> to Oct. 20 <sup>th</sup>	Module 3: Optimization
Oct. 20 <sup>th</sup>	Module 3 Formative Assignment Due
Oct. 23 <sup>rd</sup> to Nov. 10 <sup>th</sup>	Module 4 - Integration
Oct. 25 <sup>th</sup>	No Lecture in Lieu of Module 2 Test
Oct. 26 <sup>th</sup>	Module 2 Summative Test (22.5%)
Nov. 2 <sup>nd</sup>	Last Day to Drop with “W”
Nov. 6 <sup>th</sup>	Module 3 Summative Test (15%)
Nov. 10 <sup>th</sup>	Module 4 Formative Assignment Due
Nov. 7 <sup>th</sup> to Nov. 11 <sup>th</sup>	No Lectures or Tutorials – Fall Study Break
Nov. 20 <sup>th</sup> to Nov. 27 <sup>th</sup>	Module 5 – Differential Equations
Nov. 27 <sup>th</sup>	Module 5 Formative Assignment Due
Nov. 30 <sup>th</sup>	Module 4 Summative Test (22.5%)
Dec. 6 <sup>th</sup>	Module 5 Summative Test (15%)
To Be Determined	Exam (90%)

### Required Texts and Resources:

- The course has a major presence on Brightspace (you may login at <https://dal.brightspace.com/d2l/login> or go through the OWL link on the Dalhousie Homepage (<http://www.dal.ca>).
- For additional reading and practice exercises, students are encouraged to purchase the following book: Single Variable calculus – Early Transcendentals, Ninth Edition by James Stewart. This is a very popular calculus textbook, so there may be used copies for sale. Older versions of the textbook will also work.



### Course Assessment Components:

Component	Weight (% of Final Grade)	Date
Tutorial Tasks	5%	Weekly
Formative Assessments	5%	By Module
Module 1 - Limits	15%	Best of Test (Sept. 28 <sup>th</sup> ) or Final Exam (Part 1)
Module 2 - Derivatives	22.5%	Best of Test (Oct. 26 <sup>th</sup> ) or Final Exam (Part 2)
Module 3 - Optimization	15%	Best of Test (Nov. 6 <sup>th</sup> ) or Final Exam (Part 3)
Module 4 - Integration	22.5%	Best of Test (Nov. 30 <sup>th</sup> ) or Final Exam (Part 4)
Module 5 - Differential Equations	15%	Best of Test (Dec. 6 <sup>th</sup> ) or Final Exam (Part 5)

## Conversion of Numerical Grades to Final Letter Grades

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

[https://www.dal.ca/campus\\_life/academic-support/grades-and-student-records/grade-scale-and-definitions.html](https://www.dal.ca/campus_life/academic-support/grades-and-student-records/grade-scale-and-definitions.html)

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

## Assessment Notes

### Formative Assessments



Students will have access to a multitude of formative assessments to gauge how they are learning without any substantive pressure of a grade. The 5% allocated to this is split evenly over the 5 modules – 1% per module. To get the 1%, students will be able to use worksheets, Webwork Practice Questions, and Formative Assignments. Each portion will be considered “100%” of the grade, so students will be able to pick and choose how they make up the 1%.

Worksheets are available for students to complete either on their own time or in class if time permits. This gives students the opportunity to test their understanding of the lecture and ask questions to the instructor (if time permits in class).

**For the Formative Assessment Grade:** Students will submit all completed worksheets on Crowdmark on the last day of the module. Each question completed will be worth 1 mark (was it completed or not). The solutions of the worksheets will be covered at the end of the lecture (if time permits), and will be posted on Brightspace the day after the worksheets are submitted.

Each module will have an associated set of practice questions on Webwork (on Brightspace) relating to the content from the lectures. The practice questions, which mimic those of the formative assignment, are done on Webwork and students have an unlimited number of attempts to answer each question, give immediate feedback on whether the answer is correct. This gives students the opportunity to hone in on any areas of uncertainty and shows them where they need to focus their studying. Students are strongly encouraged to do these questions after each lecture, and then once they have the understanding, do the associated question on the formative assignment. The practice questions are completely optional.

**For the Formative Assessment Grade:** Students get 1 grade per correct blank. Note that Webwork initializes the grade as 0, and then the grade goes up on completion.

Formative Assignments will be submitted on Crowdmark using Brightspace. Assignments will open with the module and will be due at 11:59PM on the last day of the module. Assignments will then be graded and will typically be returned within one week. Solutions to the assignments, as well as a feedback form summarizing common mistakes, will be posted on Brightspace after they are graded.

**For the Formative Assessment Grade:** Students will receive both formative feedback on Crowdmark, as well as grading scheme comments that would mimic how those types of questions will be graded on the tests. However, for the actual Formative Grade, each completed question (regardless of correctness) will be given one mark.

Throughout the course, students are encouraged to work and collaborate with their peers on all formative assignments (but not on tests or the exam). Since the formative assignments are not worth any marks towards the final grade, students can try their best but not be negatively impacted by incorrect answers. Even if students do not finish the assignment completely, they are strongly encouraged to submit their assignment to garner feedback from the markers.

Students who receive 100% in **ALL** formative assessments in **ALL** modules will be awarded a 2% bonus added onto their final grade. Students who receive 100% in **ALL** formative assessments in **THREE** modules will be awarded a 1% bonus added onto their final grade.

As past students have said: “to do well on the assignments, you have to do the worksheets, and to do well on the tests you have to do the assignments.” Students are strongly encouraged to complete the assignments even though they are not worth any marks. Doing so increases the chances of being successful on the tests.

## Tutorials



Tutorials will take place throughout the week **starting on September 11th**. These tutorials will be a place for students to work in groups to solve more interactive and hands-on problem sets that will take the knowledge they’ve learned in class and apply it to computer science. Students are encouraged to work in groups.

Tutorial grades will be worth 10 marks each (see Brightspace for the grading scheme). Each week there will be an assigned task which will be given during the tutorial. If a student cannot make the tutorial one week, please submit a Student Declaration of Absence on Brightspace. Missed tutorials will be exempt.

**Students are required to get at least 60% in the tutorials to pass the course.**

Summative  
Tests



Each module will have a summative test on all the material in that module. A non-programmable/non-graphing calculator may be permitted during the test, but no other aids will be allowed (i.e. no study document). The tests will be split into two portions. The first portion will be an independent test worth 100% of the grade, and the second portion will be a collaborative test worth bonus marks. The first portion must be done independently. However, for the second portion, students may work in groups.

The dates, times, locations, and weight of the tests are as follows:

Module	Date	Time	Place	Weight
Limits	Thursday Sept. 28 <sup>th</sup>	7:30PM-9PM (individual) 9:15PM - 9:45PM (collaborative)	Rowe Building Potter Auditorium	15%
Derivatives	Thursday Oct. 26 <sup>th</sup>	7:30PM-9PM (individual) 9:15PM - 9:45PM (collaborative)	Rowe Building Potter Auditorium	22.5%
Optimization	Monday Nov. 6 <sup>th</sup>	7:30PM-9PM (individual) 9:15PM - 9:45PM (collaborative)	Rowe Building Potter Auditorium	15%
Integration	Thursday Nov. 30 <sup>th</sup>	7:30PM-9PM (individual) 9:15PM - 9:45PM (collaborative)	Rowe Building Potter Auditorium	22.5%
Differential Equations	Wednesday Dec. 6 <sup>th</sup>	7:30PM-9PM (individual) 9:15PM - 9:45PM (collaborative)	Rowe Building Potter Auditorium	15%

Exam



For the final exam, students will be allowed a one-page (double sided) study document and a non-programmable/non-graphing calculator, but no other resources may be used. The exam will be split into 5 Portions, one portion for each of the modules (the collaborative portion is not a part of the exam).

The final grade for each of the module sections (15%, 22.5%, 15%, 22.5%,15%) will be the highest grade between the test and the final exam portion.

**In order to write the exam, students must have written at least three summative tests.** Students missing three or more summative tests, regardless of the reason, will not be permitted to write the final exam unless explicit permission is granted by the instructor prior to the exam.



## Course Policies

- This course requires that students be on campus when Public Health and Dalhousie allows it. All tests, labs, and the exam will require students to be on campus and write in person.
- Missed Summative Tests will be counted as zero, unless prior permission is made.
- Since each module grade is the better grade between the summative test and the exam, no SDAs (Student Declaration of Absence) may be used in this course (we will not accept them for the final exam) other than for Tutorial participation. SDAs cannot be used for Tutorial Reflections.
- It will not be possible to write the final exam early and there will only be a make-up of the final exam in case of illness or family emergencies.
- All questions regarding this course must be asked on the Brightspace discussions threads. Please read all previously asked questions before you post. No questions asked via email will be answered unless they are private or personal.



## Important Notes



- A minimum grade of C (60+) is required in this course if you are a BSC student.
- As of 2019, students who receive a grade lower than a C in the same required CS course twice, will be dismissed.
- **A student must achieve a grade of 60% in all modules and the tutorials of the course to pass the course (C or greater)**
- In the case of an Academic Integrity allegation where the student is found to have violated the Academic Integrity policy and the penalty is a 0 on the test, the student must write the corresponding portion of the exam and achieve at least a 60% on that portion to pass the course. The student will then receive the grade for the exam but it will only account for 50% of the module weight. For example, if there is an Academic Integrity violation during Module 1 Summative Test, the student will:
  - a. be required to write the Module 1 portion of the final exam;
  - b. be required to achieve a grade of 60% on that portion of the final exam in order to pass the course;
  - c. be given 50% of their exam grade for the Module 1 portion of the final grade.

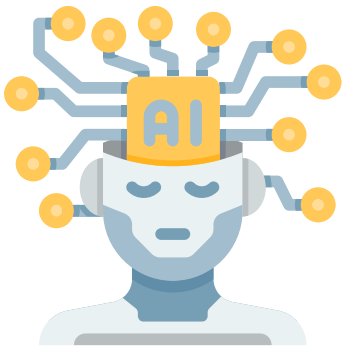
## Use of Artificial Intelligence

You may use AI-driven tools to assist you in learning but remember that your objective is to understand, achieve, and apply the course competencies and outcomes.

While you may use tools for learning, summative tests and exams in this course will disallow the use of AI-driven tools to assert that you have attained course learning outcomes. This is because a graduate must be able to analyze, assess, and produce work unassisted by AI technology.

Where tools are allowed, you must acknowledge all tools used to assist you. If applicable, you must provide links to chat logs.

Using AI-driven tools where prohibited constitutes an academic offense.



## Student Expectations:

### Culture of Respect

#### Conduct in the Classroom:

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:

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). (read more: <http://www.dal.ca/cultureofrespect.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." <https://www.dal.ca/about-dal/internationalization.html>

## 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. 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. (read more: [http://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](http://www.dal.ca/dept/university_secretariat/academic-integrity.html))

## Academic Standards:

Failure to properly attribute sources in your work will be treated as an academic standards issue and points may be deducted for not following citation requirements. For example, forgetting to quote text taken from other sources, failure to include in-text citations, or a failure to include required information in the citations or references. Please see the resources on proper citation provided by the Dalhousie Writing Center (<https://dal.ca/libguides.com/c.php?g=257176&p=5001261>).

Please note that if it appears that the error was made with intent to claim other people's work as your own such as a lack of both citations and references, an allegation of plagiarism will be submitted to the Faculty Academic Integrity Officer, which could result in consequences such as a course failure.

## 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. (read more: [https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university\\_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf](https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf))

## Use of Plagiarism Detection Software:

All submitted code may be passed through a plagiarism detection software, such as the plagiarism detector embedded in Codio, the Moss (<https://theory.stanford.edu/~aiken/moss/>) Software Similarity Detection System, or similar systems. If a student does not wish to have their assignments passed through plagiarism detection software, they should contact the instructor for an alternative. Please note, that code not passed through plagiarism detection software will necessarily receive closer scrutiny. [https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university\\_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf](https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf)

## 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. (read more: [https://www.dal.ca/dept/university\\_secretariat/policies/academic/fair-dealing-policy-.html](https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html))

**Student Use of Course Materials:**

These course materials are designed for use as part of the CSCI courses 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 material to a commercial third party website) may lead to a violation of Copyright law.

**Responsible Computing Policy:**

Usage of all computing resources in the Faculty of Computer Science must be within the Dalhousie Acceptable Use Policies ([https://www.dal.ca/dept/university\\_secretariat/policies/information-management-and-technology/acceptable-use-policy-.html](https://www.dal.ca/dept/university_secretariat/policies/information-management-and-technology/acceptable-use-policy-.html)) and the Faculty of Computer Science Responsible Computing Policy. For more information please see [https://www.dal.ca/content/dam/dalhousie/pdf/faculty/computerscience/policies-procedures/fcs\\_policy\\_local.pdf](https://www.dal.ca/content/dam/dalhousie/pdf/faculty/computerscience/policies-procedures/fcs_policy_local.pdf)

**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. (read more: [https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university\\_secretariat/policy-repository/Code%20of%20Student%20Conduct%20rev%20Sept%202021.pdf](https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/Code%20of%20Student%20Conduct%20rev%20Sept%202021.pdf))