Mathematics 1121H – Calculus II
Trent University, Winter 2026

Instructor

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Department of Mathematics

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Prerequisite: A pass in MATH 1111H or at least 80% in MATH 1110H. Not open to students enrolled in or with credit for MATH 1005H, 1006H, 1120H, or 1122H except by permission of the department.

Text: *Single Variable Calculus* (Early Transcendentals), by David Guichard, 2025, free (licensed under the Creative Commons BY-NC-SA License). There will be a copy on Blackboard, or you could download the book from www.whitman.edu/mathematics/multivariable/ . For some topics, the textbook will be supplemented by handouts.

Meetings

Lectures: Mondays 13:00-15:50 in SC 115 and Tuesdays 12:00-12:50 in ENW 103.
Labs: Tuesdays 11:00-11:50 in DNA B104. *Workshops:* Wednesdays 13:00-13:50 in ENW 103.
Consult the Academic Timetable for up to date times and locations:
    https://www.trentu.ca/registrar/timetable/undergraduate

Marking Scheme

There will be at least eleven weekly assignments (mostly due Fridays) and a final examination. These will weigh as follows in the final mark:

Best 10 assignments (6.5% each)	65%
Final examination	35%

Please note that work worth at least 25% of the course should be marked and returned by the final date (Tuesday, 10 March) to withdraw from the course without academic penalty. Students unable to complete assignments in time should contact the instructor as soon as possible.

This scheme may be modified for individual students in *exceptional* circumstances. Any such modification will require the agreement of both the student and the instructor.

Content & Learning Outcomes

MATH 1121H covers techniques and applications of integration, sequences, series, and power series, with applications to other areas of mathematics and the sciences. It is particularly aimed at majors in Mathematics and Physics. Upon successful completion of this course, a student should be able to:

1. Compute definite and indefinite integrals of many functions using various substitutions, integration by parts, and/or partial fractions.
2. Identify and evaluate improper integrals.
3. Use integrals to compute the arc-length of curves, the areas of surfaces of revolution, and and the volumes and centres of mass of various objects.
4. Compute limits of sequences, using both direct (*e.g.* algebraic) and indirect (*e.g.* squeeze-play) methods.
5. Use various tests to determine whether a given series converges or not, and be able to compute the sum of some (*e.g.* geometric series).
6. Use various tests to determine the radius and interval of convergence of a power series.
7. Use Taylor's formula to find the Taylor series of a function at a point, and be able to use a remainder term to estimate how close a Taylor polynomial is to the original function.

8. Have a basic understanding of the Riemann integral and the Fundamental Theorem of Calculus. Have sufficient abstract conceptual understanding of continuity, derivatives, integrals, and antiderivatives to understand the main ideas in the proofs of some of the results and techniques used in the course (*e.g.* the Comparison and Ratio Tests), and the statements of various others well enough to use them (*e.g.* term-by-term differentiation and integration of Taylor series inside the radius of convergence).

Schedule

In terms of content, this schedule should be taken with a grain of salt: no lesson plan survives contact with students unchanged. We will speed up or slow down, and perhaps rearrange some material, depending on how things go. Please note that while we will not fully cover the content of every chapter, we will from time to time cover material that is not in the textbook. Some assignments may involve using `SageMath`.

Weeks 1 & 2. *(7-16 January)* Chapters 7 & 8: Definite and indefinite integrals, properties of integrals, techniques of integration. Assignment # 1 due on Friday, 16 January.

Weeks 3 & 4. *(19-30 January)* Chapter 8: More techniques of integration, improper integrals (§9.7). Assignment #2 due on Friday, 23 January, and Assignment #3 due on Friday, 30 January.

Weeks 5 & 6. *(2-13 February)* Chapter 9: Applications of integration to areas, volumes, and centers of mass. Assignment #4 due on Friday, 6 February, and Assignment #5 due on Friday, 13 February.

Reading Week. (16-20 February) Enjoy! *University closed for Family Day on Monday, 16 February.*

Weeks 7 & 8. *(23 February – 6 March)* Chapters 9 & 11: Applications of integration to arc lengths and surface areas. Sequences and series, convergence tests. Assignment #6 due on Friday, 27 Febuary, and Assignment #7 due on Friday, 6 March.

Weeks 9 & 10. *(9-20 March)* Chapter 11: More convergence tests, power series. Assignment #8 due on Friday, 13 March, and Assignment #9 due on Friday, 20 March. *The last date to withdraw from Winter courses is Tuesday, 10 March.*

Weeks 11 & 12. *(23 March – 3 April)* Chapter 11: Calculus with power series, Taylor series. Assignment #10 due on Friday, 27 March, and Assignment #11 due on Thursday, 2 April. *University closed on Good Friday, 3 April.*

Week 12.5. *(6-7 April)* Catch-up and cleanup. *Classes end on Tuesday, 7 April.*

Examination period. *(10-23 April)* The final exam will be written at a time and location to be determined.

Academic Integrity

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from failure on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent Universitys Academic Integrity Policy. You have a responsibility to educate yourself unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trents Academic Integrity website to learn more: `www.trentu.ca/academicintegrity` *.*

For clarity, the following guidelines will apply in MATH 1120H:

You are permitted and encouraged to work with others and ask anyone willing for explanations, hints, and suggestions on the assignments, and to consult whatever sources you wish. However, **all work submitted for credit must be written up entirely by yourself, giving due credit to all relevant sources of help and information. For the final exam, you may not give or receive any help, nor use any aids except for a calculator (any that can't communicate wirelessly) and an aid sheet (one letter- or A4-sized sheet with whatever you want written on all sides)**, except with the instructor's permission or as mandated by Student Accessibility Services.

Access to Instruction

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and documentation from a regulated health care practitioner and feels that they may need accommodations to succeed in a course, the student should contact the Student Accessibility Services Office (SAS) at the respective campus as soon as possible.

Stefan's Calculus Archive Page

... is at `http://euclid.trentu.ca/math/sb/calculus/` and has links to quizzes, assignments, tests, and exams, many with solutions, from past iterations of MATH 1120H and other first-year calculus courses.

Last modified 2025-11-23.