

Mathematics 1210/1171
Calculus I
Winter 2025

Instructor: Dr. Luis Santiago

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Lectures: Mondays, Wednesdays and Fridays from 10:30 AM to 11:30 AM, AT1001.

Labs: Fridays from 8:30 AM to 9:30 AM, BB1021.

Office Hours: Mondays from 11:30 AM to 1:30 PM, RB3008.

Textbook: This class will not have a textbook required to purchase. Lecture and lab notes will be provided for free (all the required course material is free). Here are some suggested references:

Recommended Textbooks: Any edition of the following:

- Calculus: Early Transcendentals, by Ron Larson and Bruce Edwards, (8th Edition Hardcover \$148.95, <https://www.cengage.ca/c/calculus-early-transcendental-functions-8e-larson-edwards/9780357759325>), (Chancellor Paterson Library, Paterson Books - 4th floor; QA 303 L3274 2003).
- Calculus: Early Transcendentals, by James Stewart, (9th Edition Hardcover \$223.95, <https://www.cengage.ca/c/calculus-early-transcendentals-9e-stewart-clegg-watson/9781337613927>), (Chancellor Paterson Library, Paterson Books - 4th floor; QA 303 L3274 2003).

Free Online Textbooks:

- Calculus Volume 1 by Edwin Herman, Gilbert Strang (<https://openstax.org/details/books/calculus-volume-1>)

- Apex Calculus, Version 3 by Gregory Hartman
(<http://www.apexcalculus.com/download>)

Course Content: The topics to be covered are, tentatively, the following:

1. Functions (definition, domain and range, representation of functions, elementary functions, piecewise functions, composition of functions, inverse functions).
2. Limits (intuitive definition, properties of limits, Squeeze Theorem, special limits, one-sided limits, infinite limits, limits at infinity, vertical, horizontal and slant asymptotes, precise definition).
3. Continuity (definition of continuity at a point and in an interval, examples of continuous functions, Intermediate Value Theorem).
4. Derivatives (definition and notations, geometric and physical interpretation, differentiability and continuity, power rule, product rule, quotient rule, chain rule, derivative formulas, higher derivatives, implicit differentiation, logarithmic differentiation).
5. Applications of Derivatives (Extreme Value Theorem, Rolle's Theorem, Mean Value Theorem, monotonicity and concavity, local extrema, inflection points, first and second derivative tests, related rates problems, optimization problems, curve sketching)
6. Integrals (definite and indefinite integrals, the Fundamental Theorem of Calculus, the substitution rule).

Labs: The lab will reinforce concepts through explanations and examples, as well as provide students with the opportunity to ask questions about the content given in class or assignment problems.

Grading Scheme:

Assignments	15 %
Midterm Exam (Wednesday February 26 from 10:30 AM to 11:20 AM)	30 %
Final Exam	55 %

Assignments: Assignments will be collected and graded online using the free online homework system WebWork. A link to WebWork can be found on the d2l webpage of the course.

Accommodations: Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please visit:

<http://studentaccessibility.lakeheadu.ca>

Important Dates: Please note the following important dates:

January 6:	First day of classes
April 4:	Final day of classes
March 7:	Final date to withdraw
February 26:	Midterm
April 7 to April 17:	Examination Period
April 19:	Exam Contingency Date
February 17 to February 21:	Study Week