Math 4151 Course Outline

Winter 2021

Instructor: A.J. Dean, **email:** andrew.j.dean@lakeheadu.ca

Office hours: By zoom appointment. All communications for this class will be electronic.

References:
Honours Calculus Lecture Notes by Volker Runde, available online;
An Analysis Textbook, by A.J. Dean, some chapters to be distributed in class;
Calculus and Linear Algebra, by Wilfred Kaplan;
The Elements of Real Analysis, by Robert G. Bartle;
Calculus on Manifolds, by Michael Spivak.

Learner Outcomes: Successful students of this course will be able to: Recognize and construct examples of metric spaces; determine topological properties of sets in metric spaces, including connectivity, compactness, closure and interior; and construct proofs of basic results in topology using open/closed sets, limit points, connectivity, and compactness; Compute limits of functions between metric spaces; Determine continuity of functions between metric spaces and construct proofs of basic results on limits and continuity; Understand the concept and properties of total differentiability in R^n, and how to derive Taylor's Theorem for functions in n variables; Understand how to obtain the classification of stationary points for functions in n variables; Understand the local properties of C^1-functions and how to derive the Inverse Function Theorem and the Implicit Function Theorem; Understand the definition of Riemann integral in R^n, first on a special domain and then on a more general domain; Understand the proof of Fubini's theorem; Understand the change of variables for the Riemann integral in R^n.

Marking Scheme: Grades will be based on weekly assignments. There will be 11 of these. They will be weighted equally, with the lowest grade being dropped.

Drop Date: The final date to withdraw from this course without academic penalty is Friday March 12.

Academic Dishonesty: All cases of academic dishonesty will be dealt with according to the university's Academic Integrity Code.

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