



Faculty of Science Course Syllabus
Department of Mathematics & Statistics
MATH 3502: Intermediate Analysis II
Winter 2025

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Course Instructor: Dr. John M. Campbell

Email: jh241966@dal.ca

Office: Rm 323 Chase Building

Lectures: M W F, 11:35 a.m.-12:25 p.m., Chase Building 319

Office hours: M W F, 12:30 p.m.-1:00 p.m., Chase Building 319

Credit hours: 3

Course topics: The full derivative for functions between Euclidean spaces, directional derivatives, Jacobian matrix, differentiability, C^1 functions, multilinear maps, higher derivatives, Taylor's theorem, extrema, inverse and implicit function theorems, extrema subject to constraints, Lagrange multipliers. Further topics may include: normed vector spaces and basic functional analysis, basic theory of manifolds in \mathbb{R}^n , Fourier series.

Prerequisites: MATH 3501.03

Course credit exclusions: MATH 3500X/Y.06

Textbook(s): The course will be entirely based on the lectures and there is no required textbook for MATH 3502. The following texts are recommended for background material related to the main topics.

Vector Calculus (3rd ed.), by J. E. Marsden and A. J. Tromba. W. H. Freeman and Company, New York (1988).

Real Analysis, by W. F. Trench. Pearson Education, New Jersey (2003).

Course assessment: Midterm 1 (25%, in February) Midterm 2 (25%, in March) Final Exam (50%, in April)

Student resources: Resources available to Dalhousie students are described via the following site.

<https://www.dal.ca/about/leadership-governance/academic-integrity/student-resources.html>

Course structure: The course delivery will be in-person according to the above **Lectures** section.

Course materials: All of the required course materials are to be given in the lectures, and, as indicated above, there are no required textbooks.

Grading system: Conversion of numerical grades to final letter grades follows the Dalhousie 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 (0-49)

Course policies on missed or late academic requirements: Please refer to the policies associated with the Student Declaration of Absence form.

Course policies related to academic integrity: Information related to the Dalhousie policies on academic integrity are available via the following site.

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

Course objectives: The MATH 3502 course provides students with a rigorous foundation given by the formalism underlying the principles of multivariable calculus.

Course content: With reference to the **Course topics** section above, the subject matter for MATH 3502 will begin according to the following schedule.

Lecture 1: Preliminaries associated with a rigorous formulation of the full derivative for functions between Euclidean spaces, including a review of n -dimensional Euclidean spaces, and a review of the geometry of real-valued functions.

Lecture 2: Basics on limits and continuity for multivariable functions.

Important dates: Please refer to the following site.

<https://www.dal.ca/study/plan-your-degree/important-dates.html>

Important dates associated with the MATH 3502 course are included below.

(Monday) January 6th: Classes for the Winter semester begin.

January 20th: Last day to register.

January 20th: Last day to add winter term courses.

January 20th: Last day to drop winter term courses with no financial implications.

February 3rd: Last day to drop winter term courses without a 'W.'

February 7th: Munro day, university closed.

February 17th: Nova Scotia Heritage Day, university closed.

March 5th: Last day to drop winter term classes with a 'W.'

March 22nd: Deadline for students to submit Final Exam Accommodation Request.

April 7th: Friday classes will be held. Classes end, fall, winter and multi-term.

Course announcements: Any announcements regarding the course will be made in class, on Brightspace, or by email. You are expected to attend class and to check Brightspace and email regularly.

Course policies on plagiarism and cheating: Tests are closed-book and must be entirely your own work. During a test, you may not collaborate with classmates or seek help from anyone other than your instructor, and you may not consult any sources such as course material, textbooks, or websites.

University policies and statements: Please refer to the following sections.

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 at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at the following site.

https://www.dal.ca/campus_life/communities/indigenous.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.' Additional internationalization information can be found at the following site.

<https://www.dal.ca/about-dal/internationalization.html>

Academic Integrity: At Dalhousie University, we are guided in all 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 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. Additional academic integrity information can be found at the following site.

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

Accessibility: The Student Accessibility Centre is Dalhousie’s centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro.

Conduct in the Classroom – Culture of Respect: 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 – 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 (Strategic Priority 5.2). Additional diversity and inclusion information can be found at the following site.

<http://www.dal.ca/cultureofrespect.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.

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.

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.

Student Use of Course Materials: Course materials are designed for use as part of this course 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 to a commercial third-party website) may lead to a violation of Copyright law.

Student Use of Online Resources from Outside Canada: Students connecting to online resources from outside Canada are responsible for ensuring awareness and compliance with any applicable laws in the country from which they are connecting.