

Math 2008A

Intermediate Calculus

Carleton University Fall 2021

Instructor: Colin Ingalls

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Office hours: By appointment on Zoom or Brightspace. Please write to me at cingalls@math.carleton.ca to schedule an appointment.

Textbook: *Multivariable Calculus*, 9th edition, by James Stewart, Daniel Clegg, Saleem Watson, CENGAGE

Ebook: <https://www.cengage.ca/c/multivariable-calculus-44-9th-edition-9e-stewart-clegg-watson/9780357042922/>

Calendar Description: Partial differentiation, chain rule, gradient, line and multiple integrals with applications, transformations of multiple integrals. Precludes additional credit for MATH 2004, MATH 2009, MATH 2000, and for MATH 2001, MATH 2002.

Prerequisites: One of MATH 1002, MATH 1005 or MATH 2007, and one of MATH 1102, MATH 1004 or MATH 1107.

Lectures: This is an asynchronous online course. The lectures will be in the form of short videos posted on Brightspace. Batches of videos will be posted twice a week close to Mondays and Wednesdays by 16:00 (or earlier). The first videos should appear on Brightspace on Thursday September 8.

Tutorials: The tutorials start on Sept. 20.

Online (AW): Mondays from 16:35 to 17:25. Live on Brightspace.

In-person (A1): Wednesdays from 16:35 to 17:25 in Tory 238.

Section	Time	Room	TA's name and email
A1	Wed 16:35–17:25	Tory 238	Seyed Soroush Kazemi
AW	Mon 16:35–17:25	Brightspace	Tunde Lapohos

Grading:

- Tests 50% (of best three out of four tests)
- Final Exam 50%

Tests: There will be four tests, which will be written in the tutorials on the following dates. **No make up, early or delayed tests will be given.**

	AW	A1
	Monday	Wednesday
Test 1	Oct. 4	Oct. 6
Test 2	Oct. 18	Oct. 20
Test 3	Nov. 8	Nov. 10
Test 4	Nov. 22	Nov. 24

Final Exam: The final exam is a cumulative three hours closed book exam scheduled by the university. The exam period runs from December 11th to December 23rd (including Saturdays). It is student's responsibility to be available at the time of the examination. In particular, no travel plans should be made until the examination schedule is published. It is the students responsibility to find out the correct date and time of the exam and the room where it takes place. Students who missed the final examination may be eligible for a deferred exam provided that they present a doctor note or another supporting document to the Registrars Office. It is the Registrars Office and not the instructor which take decision of granting a deferred examination. After the exam is written, students may see their final examination papers. This examination review is for educational purpose only and NOT for negotiation of the grade.

Calculators: Only non-programmable and non-graphical calculators are allowed for tests and the final exam.

Practice problems lists: Practice problems lists will regularly be posted on Brightspace. These problems are not to be handed in and will not be graded. However, in order to succeed in the course, it is absolutely essential to practice on a regular basis.

Withdrawal: The last day for academic withdrawal is December 10th.

Notes:

1. The best three out of four tests will be used to determine the test component of your final mark. If it is impossible for you to do a particular test, please let me know as soon as possible by writing me an email.
2. Problem lists, comments, solutions and other information will regularly be posted on Brightspace. It is your responsibility to look on Brightspace to obtain this information.
3. I will not necessary follow the same order of topics as in the textbook. The best way to know where exactly we are in class is to come to class or to follow the order of topics found in the practice problems lists.
4. Following the online classes is very important and I strongly encourage you to do so.

Academic Accommodation:

Pregnancy obligation: Contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>.

Religious obligation: Contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>.

Academic accommodations for students with disabilities: If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. PMC website: <https://carleton.ca/pmc>.

Topics:

12.1 Three-Dimensional Coordinate Systems

12.2 Vectors

12.3 The Dot Product

12.4 The Cross Product

12.5 Equations of Lines and planes

12.6 Cylinders and Quadric Surfaces

13.1 Vector Functions and Space Curves

13.2 Derivatives and Integrals of Vector Functions

13.3 Arc Length and Curvature

13.4 Motion in Space: Velocity and Acceleration

14.1 Functions of Several Variables

14.2 Limits and Continuity

14.3 Partial Derivatives

14.4 Linear Approximations

14.5 The Chain Rule

- 14.6 Directional Derivatives and the Gradient Vector
- 14.7 Maximum and Minimum Values
- 14.8 Lagrange Multipliers
- 15.1 Double Integrals over Rectangles
- 15.2 Double Integrals over General Regions
- 15.3 Double Integrals in Polar Coordinates
- 15.4 Applications of Double Integrals
- 15.6 Triple Integrals
- 15.7 Triple Integrals in Cylindrical Coordinates
- 15.8 Triple Integrals in Spherical Coordinates
- 15.9 Change of Variables
- 16.1 Vector Fields
- 16.2 Line Integrals
- 16.3 Fundamental Theorem for Line Integrals
- 16.4 Green's Theorem

Tentative Lecture Schedule

Week	Dates	Sections
0	Sept. 8	12.1, 12.2
1	Sept. 13 - 15	12.3, 12.4
2	Sept. 20 - 22	12.5, 12.6
3	Sept. 27 - 29	13.1, 13.2
4	Oct. 4 - 6	13.3, 13.4
5	Oct. 13	14.1, 14.2
6	Oct. 18 - 20	14.3, 14.4
		Reading week
7	Nov. 1 - 3	14.5, 14.6
8	Nov. 8 - 10	14.7, 14.8
9	Nov. 12 - 16	15.1, 15.2, 15.3
10	Nov. 15 - 17	15.4, 15.6
11	Nov. 22 - 24	15.7, 15.8
12	Nov. 29 - Dec. 1	15.9, 16.1
13	Dec. 6 - 8	16.2, 16.3
14	Dec. 10	16.4