Fall-Winter 2025-26 – University of Toronto

MAT235Y1 Y: Multivariable Calculus

1 Contact information

Course administrative email: admin235@math.toronto.edu

LEC0101 (first term): Mikale Reddy
Email: mikale.reddy@mail.utoronto.ca

LEC0101 (second term): Nikita Klemyatin
Email: nk2957@columbia.edu

LEC0201: Marielle Ong
Email: marielle.ong@utoronto.ca

LEC0301: Aiden Backus
Email: aidan.backus@utoronto.ca

LEC0401: Jason Siefken
Email: siefkenj@math.utoronto.ca

LEC0501: Obinna Kennedy Idu
Email: o.idu@utoronto.ca

LEC0601: Mehul Gupta
Email: mmgupta@math.utoronto.ca

LEC0701: Shahaboddin Shaabani
Email: shahaboddin.shaabani@utoronto.ca

LEC5101: Maarten Mol
Email: maarten.mol@utoronto.ca

LEC5201: Cesar Rodriguez
Email: alexander.rodriguez@mail.utoronto.ca

Office hours will be posted on Quercus.

2 Course overview

2.1 Official course description

Parametric equations and polar coordinates. Vectors, vector functions and space curves. Differential and integral calculus of functions of several variables. Line integrals and surface integrals and classic vector calculus theorems. Examples from life sciences and physical science applications.

Prerequisite: MAT133Y1/ MAT133Y5/ (MATA32H3, MATA33H3)/ (MAT135H1, MAT136H1)/ (MAT135H5, MAT136H5)/ MAT134Y5/ MAT135Y5/ (MATA30H3/ MATA31H3, MATA36H3/MATA37H3)/ MAT137Y1/ MAT137Y5/ MAT157Y1/ MAT157Y5

Exclusion: MAT235Y5/ (MAT232H5/ MAT233H5, MAT236H5/ MAT368H5)/ (MATB41H3, MATB42H3)/ MAT237Y1/ MAT291H1/ MAT294H1

Recommended Preparation: MAT223H1/ MAT223H5/ MATA22H3/ MATA23H3/ MAT240H1/ MAT240H5

2.2 Course topics

We will cover the following course units in MAT235. The corresponding sections of the textbook are indicated below. Not all material from the indicated sections will be covered, and some material may be covered in an order which is different from that of the textbook. More details about the coverage for each week will be announced in advance on Quercus. An approximate schedule can be found at the end of this syllabus.

Unit 1: Multivariable Functions. §12.1, 12.2, 12.3, 12.4, 12.5, 12.6

Unit 2: Vectors and Linear Algebra. §13.1, 13.2, 13.3, 13.4

Unit 3: Partial Derivatives and the Gradient. §14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8

Unit 4: Critical Points and Optimization. §15.1, 15.2, 15.3

Unit 5: Double and Triple Integrals. §16.1, 16.2, 16.3, 16.4, 16.5, 21.2

Unit 6: Line Integrals and the Fundamental Theorem of Calculus. §17.1, 17.2, 17.3, 18.1 - 18.4

Unit 7: Surface Integrals and The Divergence Theorem. §21.1, 19.1, 19.2, 21.3, 19.3, 19.4

Unit 8: The Curl and Stokes' Theorem. §20.1, 20.2, 20.3

For each section, a short list of **learning objectives** will be provided. The purpose of these learning objectives is to help guide and focus your studies. **Not all learning objectives will be addressed in lecture**, and so it is your responsibility to ensure that you have met each goal, whether it be via lecture, tutorial, or textbook readings.

2.3 Textbook and course materials

The textbook for the course is **Calculus: Multivariable, 8th edition, with WileyPLUS access** by Hughes-Hallett. You can either purchase a physical or electronic copy from the bookstore; both options will be bundled with WileyPLUS access. **You only need to purchase one of these options.** WileyPLUS access is required to complete all of the pre-class assignments (see below for details) and also gives you access to a large number of practice problems, resources, and videos. The MAT235 team **strongly recommends purchasing the textbook bundle from the UofT bookstore**, as the bundle is cheaper if you purchase it from the bookstore vs. directly from the publisher.

The chapters from the textbook are **required reading**. Detailed instructions on what to read (or what not to read) will be available on Quercus. Please note that practice problems will be assigned from the textbook, so it is imperative that you have the correct edition.

2.4 Course website and communication

All course materials, announcements, and grades will be available on Quercus at q.utoronto.ca. All lectures and tutorials are scheduled to take place in person. Office hours will primarily be held in person, but, for the sake of convenience, we may offer a few online office hours at the discretion of the instructors and TAs.

The University has a policy requiring that students have a UofT email address and that you check it regularly. Please use your UofT email address when contacting any member of the MAT235 team. Furthermore, please include "MAT235" in the subject line in order to ensure that your email is not missed. Please refrain from emailing your TA; their availability is limited, and reading/responding to emails is not within their TA duties. Given the difficulty in effectively communicating mathematics over email, the MAT235 team requests that you **do not** send detailed math questions over email. Instead, please make an attempt to attend office hours.

2.5 Lectures, tutorials, office hours

This course will consist of **three weekly one-hour lectures** and **one weekly tutorial session**. All lectures and tutorials are scheduled to take place in person. The schedule for lectures is as follows:

For up-to-date information on lecture and tutorial times and rooms, please refer to the official Faculty of Arts & Science 2025/2026 Timetable. Students must attend the lectures of the section they are officially registered, and not lectures of any other section unless approved by the course coordinator. Students are expected to check the course site for updates as the contents of this syllabus may change.

Section	Schedule	Instructor(s)
LEC0101	MWF 9-10	Mikale Reddy & Nikita Klemyatin
LEC0201	MWF 10-11	Marielle Ong
LEC0301	MWF 11-12	Aiden Backus
LEC0401	MWF 12-13	Jason Siefken
LEC0501	MWF 14-15	Obinna Kennedy Idu
LEC0601	MWF 15-16	Mehul Gupta
LEC0701	MWF 16-17	Shahaboddin Shaabani
LEC5101	MWTh 17-18	Maarten Mol
LEC5201	MWTh 18-19	Cesar Rodriguez

Tutorials will start **the week of September 15**. Students must attend the tutorials of the section they are officially registered in, and are not permitted to attend the tutorials of any other section. During tutorials, your TA will assign problems for you to work on with your peers. These tutorials will then conclude with a short **tutorial quiz**, which will be administered by your TA and will take place toward the end of your scheduled tutorial time slot. More details on tutorial quizzes can be found below.

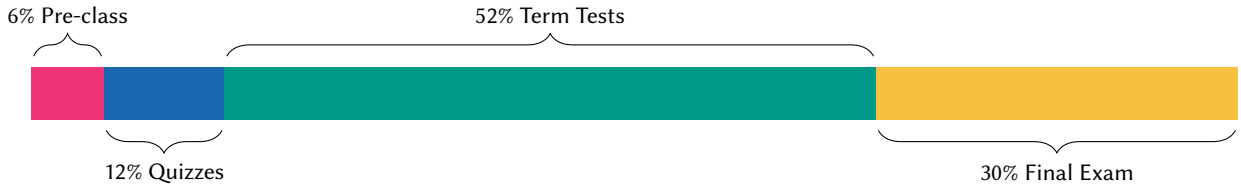
In addition to lectures and tutorials, there will be weekly office hours held by the MAT235 team. This is an opportunity for you to ask questions about the material outside of lectures and tutorials. No appointment is necessary; you are welcome to drop in any time during an office hour. Office hour schedules will be posted on Quercus.

The unauthorized use of any lecture or tutorial materials provided by a MAT235 instructor or TA is covered by the Canadian Copyright Act and is prohibited. Students must obtain prior written consent to any kind of use beyond a MAT235 setting. In this course, you are permitted to download materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor.

3 Evaluation and assessments

3.1 Marking scheme

Your final grade for the course will be computed as follows:



3.2 Pre-class assignments

Each week, you will have two types of pre-class assignments (or **PCA**): A required reading assignment from the textbook (not graded), and a graded pre-class assignment administered via WileyPLUS. There will be **8 graded pre-class assignments per term**, for a total of 16 for the academic year. Each graded pre-class assignment will be due on **Tuesdays at 6pm**. Please note that there will be no graded pre-class assignment during weeks in which there is a term test. A detailed schedule is given on the last page of this syllabus. Details about the assigned pre-class readings will be provided on Quercus. You are allowed to use your course notes and the textbook when completing the pre-class assignments,

but **you must complete your pre-class assignments individually**. Each pre-class assignment will become available approximately one week prior to the due date.

Your best 12 PCA grades will account for 6% of your final course grade; the lowest four PCA grades will be dropped. In lieu of this flexibility, we will not offer any make-up assignments, and we will not extend the deadline for an assignment under any circumstances.

3.3 Tutorial quizzes

There will be **4 tutorial quizzes per term**, for a total of 8 for the academic year. A detailed schedule is given on the last page of this syllabus. The quizzes will be administered **in tutorials**. You are required to attend the tutorial in which you are registered; if you attend another tutorial and write a quiz, it will not be graded and you will receive a 0 for that week's quiz. The quizzes will take place during the second half of your tutorial and will consist of a short written question based on the material covered in the current tutorial and/or the previous week's lectures. You will be given **15 minutes** to work on your quiz. During the first part of tutorial, your TA will assign problems which will be similar to the quiz problem. In some tutorials, your TA may also introduce concepts which are not introduced in lecture. You will be given the opportunity to work in small groups in order to solve the assigned tutorial problems before the quiz takes place. Although you will be working with your peers in the first part of your tutorial, **once the quiz begins you will write your quiz individually**. In order to verify your identity, you **must present your TCard to your TA upon request**.

Important note: Please ensure you write your full name **as it appears on Quercus** prior to submitting your quiz. Otherwise, your TA will be unable to assign you a grade.

Your best 6 quiz grades will account for 12% of your final course grade; the lowest two quiz grades will be dropped. There will be no make-up quizzes. Due to the flexibility built into the marking scheme, we do not allow temporary tutorial switches. More details about the coverage of each quiz will be announced on Quercus at least one week in advance. **You are not permitted to discuss the quiz content until all tutorial sections have finished their quiz for the week.**

3.4 Term tests

There will be **four term tests** focused on problem solving. Each term test will be **90 minutes in length**. The tests may consist of a mix of short answer and written portions. Your solutions to the short answer problems will only be graded for correctness; you do not need to show your work for short answer problems. Your solutions to the written problems **will be graded for both correctness and clarity**. For written problems, it will not be enough to simply produce a correct final answer: you will need to show how you arrived at your answer by providing a complete and clear solution. Likewise, you may still receive partial marks even if you do not arrive at a correct final answer but demonstrate an understanding of the key ideas or progress towards the correct answer. Not all questions will be of equal difficulty or be worth the same number of points. More details about the coverage of each term test will be announced on Quercus at least one week in advance.

The term tests will be held in person on **October 17 (7:10pm to 8:40pm), November 28, February 6, and March 13** from **6:10pm to 7:40pm**; locations will be announced on Quercus prior to the term tests. The term tests are **closed-book**: no resources are permitted, and you are not permitted to bring a calculator. In order to verify your identity, you **must present your TCard to your invigilator upon request**. Each term test will count toward 13% of your final grade.

If you are not able to attend a term test and you have a legitimate reason for being unable to attend (e.g. scheduling conflicts), you may be permitted to write the term test at an earlier time on the test day. In this case, you will be asked to complete a form containing the following information:

- Your name and UofT email.
- The reason for your absence.
- Documentation containing proof that you will be unable to attend the regular sitting.

The request form will be made available before each term test; the form must be submitted **at least one week** prior to the main sitting. If you submit a late request, your request will not be accepted. If your request is accepted, you will be authorized to write your term test on the same day at an early sitting; these will be scheduled for 4:10pm to 5:40pm (or 5:10-6:40pm for October 17 date). **No other make-up tests or time slots will be offered.** The number of students who can write the early sitting is limited, and early sittings will be offered on a first-come, first-served basis. Please see the next section for the missed test policy for MAT235.

3.5 Final exam

The final exam for the course will take place during the final exam period for April 2025 (between April 9 and April 30, inclusive). The final exam will take place in person and will be **3 hours in length**. The final exam will account for 30% of your final grade. More details will be given closer to the final exam period.

4 Course policies

4.1 Policy on missed term work

As flexibility for missed course assignments has been built into the marking scheme, missed term work will not be rescheduled, and no make-up tests, assignments or quizzes will be offered. Please note that effective for the Fall/Winter 2025-26 session, the Absence Declaration Policy has changed and students are only permitted to submit the absence declaration once for an undocumented reason across all courses. If a student needs to submit another absence after their first undocumented one, they may need to provide some form of documentation to an instructor or for a petition. The declaration is available on ACORN under the Profile and Settings menu. Please see https://registrar.utoronto.ca/policies-and-guidelines/absence-declaration/ and https://www.artsci.utoronto.ca/current/academics/student-absences for more information about absence declaration and about acceptable forms of documentation.

4.2 Missed term test policy

In case of a missed term test, you will be asked to provide documentation to support your request for academic consideration. If approved, the weighting of any missed term tests will be moved to the final exam. A link to a missed test form will be made available on Quercus. You will be required to submit this form at most one week after the term test has taken place.

4.3 Missed quiz policy

No adjustments will be made for missed tutorial quizzes, since the lowest two quiz grades are dropped. The remaining quizzes will contribute to your overall quiz grade for the course.

4.4 Missed pre-class assignment policy

No adjustments will be made for missed pre-class assignments. Your best 12 PCA grades will account for 6% of your final course grade; the lowest four PCA grades will be dropped.

4.5 Email policy

1. If you email us, please put "MAT235" somewhere in your subject line and use your **@mail.utoronto.ca** address. It's the only way we can know that you're you.
2. **If you have a question about the course policies, check the syllabus. Then check it again.** If you still didn't find your answer, please email your instructor.
3. If you send us an email, you are **communicating in a professional context**. Your email should start with a respectful greeting (hint: "Dear Professor X," or "Dear Dr. X,"), have organized paragraphs, and be signed with your name. We reserve the right to respond with, "Unprofessional. Try again." But don't worry too much about your grammar or spelling – we really do want to help you, however you write!
4. For administrative questions, please write to admin235@math.toronto.edu. The administrative email should be used for any course-wide requests or concerns.
5. For questions related to your specific lecture section, please contact your instructor directly. For mathematical questions, we strongly prefer that you visit during office hours.

5 Institutional policies and support

5.1 Academic integrity

The MAT235 team is strongly committed to assigning grades based on our students' honest efforts to demonstrate learning in this course. Academic dishonesty in any form will thus not be tolerated in this course. All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters:
https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019.
If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, please reach out to the course coordinator. Note that you are expected to seek out additional information on academic integrity from the course coordinator or from other institutional resources (for example, the University of Toronto website on Academic Integrity http://academicintegrity.utoronto.ca). **Potential offences** include, but are not limited to:

- Using any sort of aid (notes, textbook, the Internet, etc.) during a term test or quiz.
- Having another student write an assessment for you, or impersonating someone else in writing one of these assessments.
- Posting course materials (including quizzes, tests, announcements, etc.) online.
- Submitting questions to assessments online, or obtaining answers online.
- Communicating with another person during a quiz or test.
- Talking to others about the content of an assessment before it has finished for all sections, including posting the content online.
- Submitting an altered term test or quiz for re-grading.
- Violating term test or quiz procedures.

5.2 Copyright

Course materials belong to your instructors, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. **Do not** download, copy, or share any course or student materials without the explicit permission of the instructors.

5.3 Accessibility

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs. Students with diverse learning styles and needs are welcome in this course. If you have a disability that may require accommodations, please feel free to approach your course coordinator and/or the Accessibility Services office as soon as possible. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.
Link to Accessibility Services website: https://studentlife.utoronto.ca/department/accessibility-services

5.4 Equity, diversity and inclusion

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. UofT does not condone discrimination or harassment against any persons or communities.

5.5 Important academic dates and deadlines

The academic dates include enrolment dates, drop deadlines, final assessment periods, petition deadlines and more. https://www.artsci.utoronto.ca/current/dates-deadlines/academic-dates

5.6 Other academic and personal supports

- Writing Centre: https://writing.utoronto.ca/writing-centres/arts-and-science
- UofT Libraries: https://onesearch.library.utoronto.ca
- Feeling Distressed? https://studentlife.utoronto.ca/task/support-when-you-feel-distressed
- Academic Success Centre: https://studentlife.utoronto.ca/department/academic-success
- College/Faculty Registrars: https://future.utoronto.ca/current-students/registrars

6 Schedule and important dates

Please see https://www.artsci.utoronto.ca/current/dates-deadlines/academic-dates for key dates set by the Faculty of Arts & Science, including all deadlines and holidays.
Please see the next page for a detailed course schedule. Please note that the lecture schedule is only an approximation and hence is subject to change.

MAT235 – Fall 2025 – Schedule (Subject to change)

Aug 31 Course intro, Ch.12.1	Sep 1	Sep 2	Sep 3 first class	Sep 4	Sep 5 class	Sep 6
Sep 7 Ch.12.2, Ch.12.3	Sep 8 class	Sep 9 PCA 1 due	Sep 10 class	Sep 11	Sep 12 class	Sep 13
Sep 14 Ch.12.4, Ch.12.5	Sep 15 class	Sep 16 PCA 2 due	Sep 17 class	Sep 18 Tutorial	Sep 19 class	Sep 20
Sep 21 Ch.12.6, Ch.13.1, 13.2	Sep 22 class	Sep 23 PCA 3 due	Sep 24 class	Sep 25 Tutorial Quiz 1	Sep 26 class	Sep 27
Sep 28 Ch.13.3, Ch.13.4	Sep 29 class	Sep 30 PCA 4 due	Oct 1 class	Oct 2 Tutorial Quiz 2	Oct 3 class	Oct 4
Oct 5 Ch.14.1, Ch.14.2	Oct 6 class	Oct 7 PCA 5 due	Oct 8 class	Oct 9 Tutorial TT1 prep	Oct 10 class	Oct 11
Oct 12 TT1 review	Oct 13 Thanks- giving!	Oct 14	Oct 15 class TT1 review	Oct 16	Oct 17 TT1 review TT1:7:10-8:40	Oct 18
Oct 19 Ch.14.3, Ch.14.4	Oct 20 class	Oct 21 PCA 6 due	Oct 22 class	Oct 23	Oct 24 class	Oct 25
Oct 26	Oct 27	Oct 28	Oct 29	Oct 30	Oct 31	Nov 1
Nov 2 Ch.14.5, Ch.14.6	Nov 3 class	Nov 4 PCA 7 due	Nov 5 class	Nov 6 Tutorial Quiz 3	Nov 7 class	Nov 8
Nov 9 Ch.14.7, Ch.14.8	Nov 10 class	Nov 11	Nov 12 class	Nov 13 Tutorial Quiz 4	Nov 14 class	Nov 15
Nov 16 Ch.15.1, Ch.15.2	Nov 17 class	Nov 18 PCA 8 due	Nov 19 class	Nov 20 Tutorial TT2 prep	Nov 21	Nov 22
Nov 23 Ch.15.3, TT2 review	Nov 24 class	Nov 25	Nov 26 class TT2 review	Nov 27	Nov 28 TT2 review TT2:6:10-7:40	Nov 29
Nov 30 Ch.15.3	Dec 1 class	Dec 2 make-up class?	Dec 3	Dec 4	Dec 5	Dec 6

MAT235 – Winter 2026 – Schedule (Subject to change)

Jan 4 Ch.16.1, Ch.16.2	Jan 5 class	Jan 6 PCA 9 due	Jan 7 class	Jan 8	Jan 9 class	Jan 10
Jan 11 Ch.16.3, Ch.16.4	Jan 12 class	Jan 13 PCA 10 due	Jan 14 class	Jan 15 Tutorial Quiz 5	Jan 16 class	Jan 17
Jan 18 Ch.16.5, Ch.21.2	Jan 19 class	Jan 20 PCA 11 due	Jan 21 class	Jan 22 Tutorial Quiz 6	Jan 23 class	Jan 24
Jan 25 Ch.17.1, Ch.17.2	Jan 26 class	Jan 27	Jan 28 class	Jan 29 Tutorial TT3 prep	Jan 30 class	Jan 31
Feb 1 Ch.17.3, TT3 review	Feb 2 class	Feb 3	Feb 4 class TT3 review	Feb 5	Feb 6 TT3 review TT3:6:10-7:40	Feb 7
Feb 8 Ch.18.1-18.3	Feb 9 class	Feb 10 PCA 12 due	Feb 11 class	Feb 12	Feb 13 class	Feb 14
Feb 15	Feb 16	Feb 17	Feb 18	Feb 19	Feb 20	Feb 21
Feb 22 Ch.18.4, Ch.21.1	Feb 23 class	Feb 24 PCA 13 due	Feb 25 class	Feb 26 Tutorial Quiz 7	Feb 27 class	Feb 28
Mar 1 Ch.19.1, Ch.19.2	Mar 2 class	Mar 3 PCA 14 due	Mar 4 class	Mar 5 Tutorial TT4 prep	Mar 6 class	Mar 7
Mar 8 Ch.21.3, TT4 review	Mar 9 class	Mar 10	Mar 11 class TT4 review	Mar 12	Mar 13 TT4 review TT4:6:10-7:40	Mar 14
Mar 15 Ch.19.3, Ch.19.4	Mar 16 class	Mar 17 PCA 15 due	Mar 18 class	Mar 19	Mar 20 class	Mar 21
Mar 22 Ch.20.1, Ch.20.2	Mar 23 class	Mar 24 PCA 16 due	Mar 25 class	Mar 26 Tutorial Quiz 8	Mar 27 class	Mar 28
Mar 29 Ch.20.3, Exam review	Mar 30 class	Mar 31	Apr 1 last class: Exam review	Apr 2	Apr 3 make-up class?	Apr 4