

University of Toronto Mississauga, Department of Mathematical and Computational  
Sciences

**MAT232H5 Calculus of Several Variables**

Syllabus

January–April 2017

**Course description**

Differential and integral calculus of several variables: partial differentiation, chain rule, extremal problems, Lagrange multipliers, classification of critical points. Multiple integrals, Green’s theorem and related topics.

This course is a prerequisite for the second multivariable calculus course, MAT236H5 Vector Calculus.

**Prerequisites/corequisites**

You must have (i) completed a 100-level calculus course (MAT134Y5/135Y5/137Y5) and (ii) you must either have completed or now be registered in a 200-level linear algebra course (MAT223H5/240H5).

If a student, who is missing a pre/co-requisite, believes that s/he does have the necessary background material, and is able to prove it (e.g., has a transfer credit from a different university), then s/he should submit a ‘Prerequisite/Corequisite Waiver Request Form’, which can be found on the department website, at <http://www.utm.utoronto.ca/math-cs-stats/sites/files/math-cs-stats/public/users/yeyvette/PrereqCoreqForm-20129.pdf> Bring this form to your Thursday, January 5 MAT232 lecture. It must be submitted in person, not emailed to us.

Students must give a REASON for requesting a waiver. Simply submitting the form DOES NOT mean they can stay in the course.

Students will be notified if they are being removed from a course. If they don’t hear anything by the end of the second week or so, then they can stay in the course. All pre-requisite checking should hopefully be completed by the end of the second week of classes.

**Lecture information**

SECTION	TIME	LOCATION
LEC0101 (Bell)	TU 9:00–11:00	DV 2082
LEC0101 (Bell)	TH 10:00–11:00	DV 2082

SECTION	TIME	LOCATION
LEC0102 (Vo)	TU 12:00–13:00	IB 150
LEC0102 (Vo)	TH 13:00–15:00	DV 2082

## Tutorial information

SECTION	TIME	LOCATION
TUT101 (Sytchenko)	TU 17:00–18:00	DV 3093
TUT0102 (Sytchenko)	TU 18:00–19:00	IB 320
TUT0103 (Zhang)	WE 17:00–18:00	IB 240
TUT0104 (Zhang)	WE 18:00–19:00	IB 340
TUT0105 (Louis)	TH 17:00–18:00	IB 320
TUT0106 (Louis)	TH 15:00–16:00	IB 340
TUT0107 (Louis)	TH 12:00–13:00	IB 350

## Administrative dates

Jan 2	Lectures begin this week
Feb 21–24	Reading Week
Mar 12	Last day to drop an S course from academic record
Mar 31	Last day of classes for term at UTM

## Textbook

*Multivariable Calculus*, 8th edition, James Stewart (ISBN-10: 1305266641).

*Student Solutions Manual* for the above textbook (recommended).

**Note.** We will **not** be using the 7th edition; the numbering of exercises are different in the 8th edition.

## Contact Information

All course information will be available on **Portal**.

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LEC0101: **Jordan Bell**

Email: [jordan.bell@utoronto.ca](mailto:jordan.bell@utoronto.ca)

Office: DH-3097D

Office hours: Thursday 12–1 pm

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LEC0102: **Huan Vo**

Email: [vohuan@math.toronto.edu](mailto:vohuan@math.toronto.edu)

Office: DH-3097B

Office hours: Tuesday 2–3 pm

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TUT101, TUT102: <b>Vladislav Sytchenko</b>	Email: vlad.sytchenko@mail.utoronto.ca
TUT103, TUT104: <b>Roger Zhang</b>	Email: roger.zhang@mail.utoronto.ca
TUT105, TUT106, TUT107: <b>Rodney Louis</b>	Email: rod7221@yahoo.com

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TA office hours in DH2034.

Time of the TA office hours will be decided by TA and announced in tutorial.

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### Email policy

Any email to the instructors should contain MAT232 in the subject line. Please use your “@mail.utoronto.ca” or “@utoronto.ca” email address. You can usually expect a response within 48 hours.

If the answer to your question is found in the syllabus, then you might not receive a response.

### Evaluation

Assignments	20%
Tests	30%
Final exam	50%

### Final Exam

The Final Exam will be **3 hours** long.

### Recommended Exercises

Recommended Exercises from the textbook are given at the end of the syllabus. These are **not** to be submitted for marking. However, students must do these weekly problems in order to prepare themselves for the tests. You are encouraged to ask your TAs for help with these problems in your tutorials.

### Tests

There will be three 50 minutes tests written in the tutorial section in which you are registered. You cannot use a calculator. If you miss a test with approval from the instructor the mark will be covered by the average of the remaining tests. You must submit documentation to your instructor either in the lecture or during their office hours, not email it to us. You must submit documentation within a week after missing a test. Remember that a medical note must not just say that you saw a physician but that the physician judges you were unfit to do work. (The Health and Counselling Centre at University of Toronto Mississauga has physicians who are experienced giving medical notes.)

As per university regulations, the MAT232 tutorials have priority over any tests that might be occurring at the same time as the tutorials, because this is the course you are registered in for that time period. **You are not allowed to skip your MAT232 test to go to another course because the only way there could be a conflict is if you have an overlap in your timetable which is not permitted.**

## Submission Guideline

All your assignments will be handled during tutorials. You can **ONLY** submit your assignments during tutorials. Late submission or submission outside of your tutorial section will **NOT** be accepted unless for very good reasons and will be dealt with directly by the instructors.

## Tutorials

All tutorial students must enroll in one tutorial section. Tests will be written in the tutorials. The last day to enroll in a tutorial section is **Jan 15**. Note that you must attend your official tutorial section as it appears on Portal.

## Tutorial changes

Tutorial section change is not allowed once a student has been assigned to a tutorial section. Students who believe they have an extraordinary reason to be allowed to change tutorials as well as those who need to enroll in a MAT232 tutorial after the Jan 15 deadline must contact their instructor to arrange a change.

## More information about tutorials

The duration of each tutorial is 50 minutes. Tutorials start the second week of classes, the week of Jan 9. The purpose of the tutorials is to give you a chance to ask questions. Each tutorial will consist of a list of selected problems. You are encouraged to attend the tutorials in order to prepare for the exams.

## Academic Integrity

Academic integrity is fundamental to learning and scholarship at the University of Toronto. Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the U of T degree that you earn will be valued as a true indication of your individual academic achievement, and will continue to receive the respect and recognition it deserves.

Familiarize yourself with the University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>). It is the rule book for academic behaviour at the U of T, and you are expected to know the rules.

The University of Toronto treats cases of academic misconduct very seriously. All suspected cases of academic dishonesty will be investigated following the procedures outlined in the Code. The consequences for academic misconduct can be severe, including a failure in the course and a notation on your transcript. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact your instructor. If you are

experiencing personal challenges that are having an impact on your academic work, please speak to your instructor or seek the advice of your college registrar.

### Accessibility

The University of Toronto is committed to accessibility. Students with diverse learning styles and needs are welcome in this course. Please feel free to approach your instructor or so we can assist you in achieving academic success in this course. Students requesting accommodation for course assessment should register with AccessABILITY Resource Centre (2037 Davis Building): <https://www.utm.utoronto.ca/accessability/>

### Tentative Schedule

Week of	Sections to be covered	Additional notes
Jan 2	12.1–12.4	
Jan 9	12.5, 12.6, 13.1	
Jan 16	13.2–13.4	
Jan 23	14.1–14.3	Assignment 1 due in tutorial
Jan 30	14.4, 14.5	Test 1 written in tutorial
Feb 6	14.6, 14.7	
Feb 13	14.8, 15.1	Assignment 2 due in tutorial
Feb 20	Reading Week	
Feb 27	15.2	Test 2 written in tutorial
Mar 6	15.3–15.6	
Mar 13	15.7–15.9	Assignment 3 due in tutorial
Mar 20	16.1, 16.2	Test 3 written in tutorial
Mar 27	16.3, 16.4	

## Suggested problems

*(This list may be updated during the term, so check regularly)*

Section	Suggested problems from Stewart, 8th edition
12.1	7, 8, 9, 14, 20, 21, 30, 35, 39, 42, 45, 47
12.2	4, 7, 12, 22, 24, 29, 41, 42, 44, 47, 48
12.3	6, 10, 11, 20, 24, 29, 44, 45, 48, 53, 61, 62
12.4	2, 6, 13, 20, 34, 37, 47, 50
12.5	1, 8, 16, 22, 23, 28, 31, 36, 45, 53, 58, 61, 66, 73, 77
12.6	9, 12, 13, 22, 23, 26, 27, 45, 46
13.1	2, 4, 11, 18, 27, 41, 44, 46
13.2	1, 6, 20, 21, 27, 34, 37, 53, 56
13.3	3, 6, 11
13.4	3, 5, 7, 8, 12, 15
14.1	5, 10, 11, 16, 18, 19, 24, 29, 30, 33, 35, 38, 39, 41, 44, 45, 48, 49, 59, 64, 66, 67
14.2	6, 7, 10, 11, 13, 15, 17, 19, 26, 29, 31, 34, 37, 40, 41
14.3	3, 6, 7, 9, 22, 23, 28, 29, 33, 35, 44, 45, 48, 49, 52, 57, 62, 65, 75, 77, 78, 91
14.4	2, 3, 5, 12, 17, 25, 32, 33, 34, 37, 39, 45
14.5	4, 7, 10, 13, 22, 28, 29, 43, 45, 46, 53, 56, 59
14.6	3, 7, 12, 24, 25, 29, 31, 33, 35, 37, 44, 46, 49, 51, 56, 59, 63, 66
14.7	3, 7, 12, 18, 19, 29, 33, 39, 42, 43, 45, 48, 49, 52, 53
14.8	4, 5, 10, 12, 15, 17, 20, 21, 34, 41, 43, 48
15.1	9, 11, 13, 17, 20, 22, 24, 30, 31, 32, 34
15.2	3, 5, 15, 21, 28, 31, 36, 37, 53, 56, 66
15.3	9, 10, 12, 17, 18, 20, 21, 22, 26, 27, 30, 31
15.4	4, 5, 8, 9, 10, 11, 13, 14, 16
15.5	2, 4, 6, 7, 8, 11, 12
15.6	3, 4, 5, 7, 8, 9, 10, 11, 13, 20, 22, 30, 31, 37, 39, 40
15.7	3, 5, 7, 9, 17, 18, 20, 22, 25, 27, 29, 30
15.8	1, 3, 5, 9, 13, 22, 23, 25, 29, 30, 35, 42, 43
15.9	3, 5, 9, 13, 15, 16, 18, 23, 24, 25, 26
16.1	3, 5, 9, 22, 24, 26
16.2	2, 4, 6, 8, 11, 13, 19, 20, 25, 34, 39, 40
16.3	4, 6, 7, 8, 9, 10, 12, 13, 14, 17, 18, 19, 20, 28, 35
16.4	1, 2, 3, 4, 6, 8, 10, 11, 12, 18, 22, 23, 24, 28