University of Toronto Mississauga
MAT 233 H5 Calculus of Several Variables
Fall 2016

Welcome to the course!

Course Description:

This is a"Bridging Course"; accepted as prerequisite for upper level courses in replacement of MAT232H5.

It covers the following topics from single variable calculus: Sequences and series, power series, Taylor series, trigonometric and inverse trigonometric functions and their use in integrations.

In addition, it covers the following topics from multivariable calculus: Differential and integral calculus of several variables; partial differentiation, chain rule, extremal problems, Lagrange multipliers, classification of critical points, and Multiple integrals.

Exclusion: MAT138Y5, 232H5, 235Y1, 237Y1, 257Y1, MATB41H3
Pre-requisite: MAT134Y5/ 135Y5/ 137Y5 or 75% in MAT133Y5
Co-requisite: MAT223H5/ 240H5

Note on requisites:

Please note that you must meet the above pre-requisites and co-requisites in order to take this course. The Department of Mathematics will be removing students from the course who do not meet the above requisites.

Instructor:

Dr. Elio Mazzeo	emazzeo@math.utoronto.ca Office: DH-3097-D	Office hours: See Course Website

Lectures:

Times:	Rooms:
Tuesday 1-3 pm	IB 345
Thursday 11-1 pm	IB 345

Please note:

This course moves quickly due to the fact that we will need to cover about 4 weeks of material of single variable calculus in addition to the material

covered in a standard multi-variable course such as Mat232H5F. In particular, note that since there are 4 lecture hours a week, **this course covers about "4 weeks of material every 3 weeks"**.

Tutorial	Time	TA's Name	E-mail
TUT 101	R 3-4	Klambauer, Maximilian	mklam@math.toronto.edu
TUT 102	R 4-5	Chi, Conglin Eric	eric.chi@mail.utoronto.ca
TUT 104	R 6-7	Chi, Conglin Eric	eric.chi@mail.utoronto.ca

      Tutorials start during the second week of classes: the week of 12th September. <u>All students must enroll in a tutorial section (on ROSI)</u>. You should attend only the tutorial you are enrolled in.

      The main purpose of the tutorials is to give you an opportunity to ask questions and work through examples together with your TA.

      To get the most out of your time, it is therefore best if you review the lecture material and work through the homework questions **before** your tutorial, so that you are prepared with questions.

Textbook:

"Multivariable Calculus", 8th Ed. by Stewart.

<u>The Student Solutions Manual is optional. It is not required nor is it recommended</u>.

Calculators:

Calculators will <u>not be allowed</u> during Tests and the Final Exam.

Course Website:

1. http://uoft.me/Mat233

2. For checking your marks, we will be using: **portal.utoronto.ca**

Marking Scheme:	4 Assignments (Best 3 of 4)	9 %
	3 Tests (12% each)	36 %
	Final Exam:	55 %

The tests will each be 50 minutes long, and will take place during the lecture time-slot but possibly in different rooms.

Test Schedule*:

Test #1: → Thursday, September 29,2016   (Week # 4)
Test #2: → Thursday, October 27, 2016   (Week # 8)
Test #3: → Thursday, November 17, 2016   (Week #11)

* The tests will take place during the lecture time slot from 12.10-1 pm.

Weekly Schedule of Evaluations:

Week 1	Sept 5-9	
Week 2	Sept 12-16	
Week 3	Sept 19-23	Assignment #1
Week 4	Sept 26-30	**Test #1**
Week 5	Oct 3-7	
Week 6	Oct 10-14	(Fall Reading Week)
Week 7	Oct 17-21	Assignment #2
Week 8	Oct 24-28	**Test #2**
Week 9	Oct 31-Nov 4	
Week 10	Nov 7-11	Assignment #3
Week 11	Nov 14-18	**Test #3**
Week 12	Nov 21-25	
Week 13	Nov 28-Dec 2	Assignment #4

Missed Tests:

There will be no make-up tests. If you miss a test due to illness or other valid reason, you must provide written documentation such as a doctor's note written on the **Official UTM Medical Certificate**. This documentation should be given to your instructor within one week following the test. (However, it must be *dated* within a day of the test.) Otherwise your test mark will be recorded as zero. Please also keep a copy for your records. If valid documentation is provided, the weight of the midterm will be shifted to the final exam.

Assignments:

There will be 4 assignments but only your best 3 assignments will count, towards a total of 9% of your final grade,. This policy is meant to take illness into account. Only a portion of the assignment may be marked. Assignments will be posted on the course website and it is your responsibility to download/print them in time to complete them by the due date. Assignments should be handed in at the **beginning** of your respective tutorial (the one you are signed up for on ROSI). **No late assignments will be accepted.** There will be no make-up assignments.

Academic Integrity:

You are encouraged to work together with other students while working on assignment questions. Working together is part of the learning process. However, you must <u>write your solutions independently</u>. **Copying solutions, or letting someone else copy yours, is an academic offence.** Students are expected to adhere to the Code of Behaviour on Academic Matters which can be found in the UTM Calendar.

Course Outline

This is a tentative course outline. We will cover these sections time-permitting. The sections correspond to "Multivariable Calculus", 8th Ed. by Stewart.

Week 1-Week 3

Trigonometric Functions Derivatives of Trigonometric Functions Inverse Trigonometric Functions Trigonometric integrals (Inverse) Trigonometric substitution	Note: for these topics, you can work through problems from an appropriate 1st year calculus textbook.
Sequences Series	11.1 11.2
The integral test The comparison tests	11.3 11.4
Alternating series Ratio and root tests	11.5 11.6
Power series Taylor series.	11.8 11.9 & 11.10

Week 4-Week 6

Topics Covered	Section
Parametric equations and curves	10.1-10.2
Polar coordinates	10.3
Areas and lengths in polar coordinates, conic sections	10.4-10.5
3-d space, vectors, the dot product, the cross product	12.1-12.4

Week 7-Week 9

Topics Covered	Section
Lines, planes, and other surfaces	12.5-12.6
Vector functions, their derivatives and integrals	13.1-13.2
Arc Length	13.3
Functions of several variables, limits and continuity, and partial derivatives	14.1-14.3
Tangent planes and the chain rule	14.4, 14.5
Directional derivative and gradient vectors	14.6

Week 10-Week 12

Topics Covered	Section
Maximum and minimum values	14.7
Lagrange multipliers	14.8
Double Integrals	15.1-15.3

Week 13

Topics Covered	Section
Triple Integrals	15.6
Triple Integrals in Cylindrical Coordinates	15.7
Triple Integrals in Spherical Coordinates	15.8
Change of Variables in Multiple Integrals	15.9

Homework:
For each topic covered in this course you are expected to do homework questions. You are NOT required to hand in your solutions, but it is important that you do as many questions as possible in order to prepare for tests and the exam. If you are finding a topic or a type of question difficult, you may want to do more problems. (You can look for questions in the corresponding section of the textbook)

Suggested Homework Problems: see the website for a list of recommended problems.

Getting Help:
        If you are finding the course difficult there are many ways in which you can get help. Please ask questions in lectures if something is unclear. Longer questions can be asked in **tutorials** or **during office** hours.
        Tutorials are also a great opportunity to work through examples on topics of your choice and ask questions about them. Working in study-

groups outside class where you can compare solutions and tackle problems together might also be helpful.

Remember that all of these options are there to help you, so please take advantage of them if you need it!

Most important of all is to keep up with the homework and to not fall behind. Ask for help early rather than the week of a test!

E-mail policy

1. Please address your professor appropriately. 2. You must use your utoronto.ca email account. 3. Please include **"233"** in the **subject** of your e-mail. 4. Questions about how to solve math questions should be asked in person during contact hours. 5. Please read the syllabus and homepage to see if your administrative question has been answered there. 6. Please don't expect a reply on weekends, or an immediate reply on weekdays.

Good luck with the course!