DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCES UNIVERSITY OF TORONTO MISSISSAUGA

MAT232H5F LEC9104 Calculus of Several Variables Course Outline - Fall 2021

Class Location & Time Wed, 11:00 AM - 01:00 PM

Thu, 06:00 PM - 07:00 PM ZZ TBA

Fri, 12:00 PM - 01:00 PM

Instructor Andie Burazin

Office Location

Office Hours MON 11:00-14:00
E-mail Address a.burazin@utoronto.ca
Course Web Site https://q.utoronto.ca

Co-Instructor Hossain Ehsaan

Office Hours Booking 15-minute appointments

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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.

Prerequisite: MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT137Y5 or MAT233H5 or MAT235Y1 or MAT237Y1 or MAT257Y1 or MAT257Y5 or MATB41H3

Recommended: MAT223H5 or MAT240H5 (SCI)

Distribution Requirement: SCI

Students who lack a pre/co-requisite can be removed at any time unless they have received an explicit waiver from the department. The waiver form can be downloaded from here.

Detailed Course Description

MAT232H Calculus of Several Variables is a second-year calculus course focusing on differentiation and integration of several variable functions. Although the course will have a theoretic component, emphasis will be on concepts, techniques, and applications. Theorems will be stated clearly, but some with proof, and many examples will be included in lectures. Topics explored: partial differentiation, chain rule, extremal problems, Lagrange multipliers, classification of critical points, multiple integrals, Green's theorem, and related topics.

Learning Outcomes

Through completing the tutorial check-ins, readiness check quiz, term tests, and final examination, engaging in lecture, tutorial, and assigned practice problems (e.g., tutorial activity sheets, suggested homework questions, supplementary problems), and seeking assistance through various means of support, student will be able to:

- Effectively write mathematical solutions in a clear and concise manner.
- Locate and use information from previous courses and current course material to solve calculus problems in several
 variables.
- Demonstrate ability to think critically by:
- interpreting and using functions of several variables.
- determining and using appropriate techniques for solving a variety of integration and differentiation problems
- setting up and solving double and triple integrals.
- Work effectively with others (e.g., instructors, teaching assistants, and peers) to complete assigned practice problems.
- Demonstrate the ability to differentiate and integrate vector-valued functions.

Textbooks and Other Materials

Multivariable Calculus: Early Transcendentals, 8th Edition, by James Stewart.

You are expected to have access to the textbook throughout the course, as homework will be a selection of problems from it. The UTM bookstore sells e-copies, as well as physical copies of the course textbook.

Assessment and Deadlines

Type	Description	Due Date	Weight
Class Participation	Tutorial Check-ins (best 10 out 12 check-ins)	On-going	10%
Quiz	Readiness Check Quiz	2021-09-23	5%
Term Test	Term Test No.1	2021-09-30	12.5%
Term Test	Term Test No.2	2021-10-21	12.5%
Term Test	Term Test No.3	2021-11-04	12.5%
Term Test	Term Test No.4	2021-11-25	12.5%
Final Exam	Final Exam	TBA	35%
		Tota	l 100%

More Details for Assessment and Deadlines

Tutorial Check-ins:

There will be twelve (12) tutorial check-ins administered during tutorial.

All students must enroll in a tutorial section (on ACORN) and attend to their registered tutorial section. During every tutorial, you will submit your check-in work. Students should have Quercus available during tutorial to submit their tutorial check-in.

Readiness Check Quiz:

The one (1) quiz will be held on Thursday, September 23rd, 2021 from 18:00 (EDT) to 19:00 (EDT).

A grace period of **10 minutes**, which is NOT a part of the actual term quiz time, will be given after the quiz is over to submit solutions through Crowdmark. If you submit solutions to the quiz, **after 19:10 (EDT)**, then an automatic ZERO (0) will be allotted for the quiz mark. Be vigilant of the time.

Details pertaining to the readiness check quiz, such as which sections are covered, will be announced on Quercus approximately one (1) week before the quiz.

Term Tests:

The four (4) tests will be held on <u>Thursdays from 18:00 (EDT/EST) to 19:00 (EDT/EST) for all lecture sections</u> The term test dates are on:

Test No.1 Thursday, September 20th, 2021 from 18:00 (EDT) to 19:00 (EDT)

Test No.2 Thursday, October 21th, 2021 from 18:00 (EDT) to 19:00 (EDT)

Test No.3 Thursday, November 4th, 2021 from 18:00 (EST) to 19:00 (EST)

Test No.4 Thursday, November 25th, 2021 from 18:00 (EST) to 19:00 (EST)

A grace period of 10 minutes, which is NOT a part of the actual term test time, will be given after the term test is over to submit solutions through Crowdmark. If you submit solutions to the term test, after 19:10 (EDT/EST), then an automatic ZERO (0) will be allotted for the term test mark. Be vigilant of the time.

Details pertaining to the term tests, such as which sections are covered on each test will be announced Quercus approximately one (1) week before each test.

Final Examination:

The regular final examination will be during the final examination period from Thursday, December \mathfrak{g}^h , 2021 to Tuesday, December 21^{st} , 2021. The actual date and time of the regular final examination will be announced once it is available by the Registrar's office.

The deferred final examination will be announced on a later date.

The duration of the final examination will be two (2) hours.

The last day for any Term Assessment Remark Requests is Tuesday, December 7th, 2021.

Penalties for Lateness

NA.

Procedures and Rules

Missed Term Work

Missed Tutorial Check-ins:

There are NO extensions. There are NO make-up tutorial check-ins.

Missed Readiness Check Quiz:

There are NO extensions. There is NO make-up readiness check quiz. If you miss the readiness check quiz, it will be a ZERO (0).

Missed Term Tests:

There will be NO make-up term tests.

The University is temporarily suspending the need for a doctor's note or medical certificate for any absence from academic participation. Please use the Absence Declaration tool on ACORN found in the Profile and Settings menu to formally declare an absence from academic participation in the University. The tool is to be used if you require consideration for missed academic work based on the procedures specific to your faculty or campus. In addition to this declaration, you are responsible for contacting the course coordinator ANDIE (a.burazin@utoronto.ca) within twenty-four (24) hours of the term test date and time to request the academic consideration you are seeking.

Record each day of your absence as soon as it begins, up until the day before you return to classes or other academic activities. The University will use this information to provide academic considerations and to monitor overall absences.

Note that the university might change the above. Please be aware of the changes in policy that the university decides.

Failure to adhere to any of these policies will result in your term test being assigned a grade of ZERO (0).

If valid documentation is provided, then the weights will be adjusted as follows:

One missed test: The remaining three term tests will be worth 16.6% each.

Two missed tests: The remaining two term tests will be worth 20.75% each, readiness check quiz 6.5%, tutorial activities will be worth 12.5%, and the final examination will be worth 39.5%.

Three or Four missed tests: Treated on a case-by-case basis, with a likely option being an ORAL EXAM arranged between the student and the instructor, administered before the last day of term (i.e., last day of lectures). This option must be completed before Tuesday, December 7th, 2021 where the student reaches out to the instructor to coordinate at date and time to meet; otherwise, all missed term tests will count as ZERO.

If you write the first three term tests and miss the fourth term test independent of the circumstance, then you will get ZERO (0) for Term Test No.4 and weights of all the term tests remain the same (each term test will be worth 12.5%).

It is highly advisable **NOT** to miss any term tests.

Missed Final Exam

Students who cannot complete their final examination due to illness or other serious causes must file an <u>online petition</u> within 72 hours of the missed examination. Late petitions will NOT be considered. Students must also record their absence on ACORN on the day of the missed exam or by the day after at the latest. Upon approval of a deferred exam request, a non-refundable fee of \$70 is required for each examination approved.

Academic Integrity

Honesty and fairness are fundamental to the University of Toronto's mission. Plagiarism is a form of academic fraud and is treated very seriously. The work that you submit must be your own and cannot contain anyone elses work or ideas without proper attribution. You are expected to read the handout How not to plagiarize (http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize) and to be familiar with the Code of behaviour on academic matters, which is linked from the UTM calendar under the link Codes and policies.

Content & Copyright:

Please be advised that the intellectual property rights in the material referred to on this syllabus [and posted on Quercus] may belong to the course instructor or other persons. You are not authorized to reproduce or distribute such material, in any form or medium, without the prior consent of the intellectual property owner. Violation of intellectual property rights may be a violation of the law and University of Toronto policies and may entail significant repercussions for the person found to have engaged in such act. If you have any questions regarding your right to use the material in a manner other than as set forth in the syllabus, please speak to your instructor.

Video Recordings:

Notice of video recording and sharing (Download permissible; re-use prohibited)

This course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session. Course videos and materials belong to your instructor, the University, and/or other source depending on the specific facts of each situation, and are protected by copyright. In this course, you are permitted to download session videos and 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. For questions about recording and use of videos in which you appear please contact your instructor.

Final Exam Information

Duration: 2 hours

Aids Permitted: Non-Programmable Calculators

Additional Information

Not knowing what is on the course outline is not an excuse. The course outline has the rules and regulations of MAT232H and its assessments to ensure fairness to all students. The rules and regulations will apply to all students and will not be modified for any student based on any personal circumstance.

All grades in MAT232H are based on student performance on assessments as stated in the course outline. There are no extra assignments or marks to boost a grade.

You are to be aware of all information provided to you on Quercus and the course outline to participate in MAT232H and its assessments

Zoom:

Lectures, tutorials, and other forms of contact if necessary for this course will be held through Zoom where the links will be available through Quercus.

Be sure to use ONLY the Zoom SSO to connect within this course and create a UTM Zoom account by going to this address:

https://utoronto.zoom.us.

Please be mindful and respectful of other students when in a Zoom session. During a session, participants shouldkeep their microphones on mute unless they have been asked to share their audio or video. Use the chat board, when your microphone is not in use, to asked questions, and the instructor or TA will address the question.

Lectures will be recorded.

All supporting documents and notes in lecture will be posted, as well as tutorial activity sheets.

It is expected that students attend during real time their lecture section and especially tutorial section as per their ACORN enrolment.

Email Policy:

All emails must originate from an **utoronto.ca** email address. No personal emails, e.g., gmail, qq, hotmail, yahoo, etc. Do not use Ouercus to email.

The subject line should contain MAT232H and your concern. End your email with your first and last name as registered at UTM and student number.

This is how your email should look like:

Subject line: MAT232H - Term Test No.2 Absence

Hello [person's name],

[content of email - to the point and short using full sentences and words]

Warmest Regards,

Full Student Name (as registered at UTM - no nicknames)

Student ID Number

This is to help your professors and teaching assistants to identify YOU and YOUR CONCERN faster, especially when they teach multiple courses at once.

Failure to adhere to these policies will result in your email not making it through our filters, and your email will not be read. Please allow forty-eight (48) hours for a response from a teaching assistant or instructor.

You should address any administrative questions (e.g. a missing grade, missing a term test, issues with Crowdmark, etc.) to ANDIE (a.burazin@utoronto.ca).

Technology for the Course:

During the COVID-19 pandemic, students are expected and responsible to have minimum technology in place to engage with and complete online taught courses. For information, please visit the link: https://www.viceprovoststudents.utoronto.ca/covid-19/techrequirements-online-learning/

To have optimal use of Quercus, please visit the following link: https://utm.library.utoronto.ca/students/quercus/learn-anywhereLinks to an external site.

Carefully read 'Taking Quizzes', because there are a lot of helpful tips on how to effectively use Quercus. The same tips will also help you with other online instructional tools such as Crowdmark.

Instructors and teaching assistants will not troubleshoot your technology issues.

For MAT232H, it is expected that students have their own consistent, stable internet connection for lectures, tutorials, office hours, other forms of electronic communication (i.e. emails, Piazza, etc.), and assessments. In particular, students are expected to have a device with consistent, stable internet access to complete all assessments and tasks in this course. Students might need a camera (on

a device) and/or scanner to digitize your assessment question solutions to upload in Quercus and/or Crowdmark. For lectures and tutorials, students may want to have a microphone to verbally communicate i.e. ask questions or give comments.

HAVING MINIMUM TECHNOLOGY TO ACCESS COURSE MATERIAL AND ASSESSMENTS IS THE STUDENT'S RESPONSIBILITY.

Crowdmark:

Quiz, Term Tests and Final Examination will be submitted through Crowdmark. You will receive an invitation via your utoronto.ca email to access Crowdmark for your assessments. To use Crowdmark, you are required to have a device with internet access which will allow you to upload your solutions within a time limit.

Piazza:

Instructors and Teaching Assistants will assist students on Piazza, an online discussion forum https://piazza.com). It is strongly suggested that you use this opportunity to ask questions. You have already been added to Piazza for this course. Any issues, please contact ANDIE (a.burazin@utoronto.ca). Please allow forty-eight (48) hours for a response from a teaching assistant or instructor. We will try our best to get to you as soon as possible.

Lectures:

Lectures begin on Wednesday, September 8th, 2021 and will be held through Zoom.

Tutorials:

Tutorials start on the week of Wednesday, September 8th, 2021, and will be held through Zoom (a link will be provided to you on Quercus).

All students must enroll in a tutorial section (on ACORN) and attend their registered tutorial section. During every tutorial, you will be working with your peers on a tutorial activity to be submitted during the tutorial. However, the main purpose of the tutorials is to give you an opportunity to ask questions and work through questions together with your TA and peers.

Office Hours:

Instructors and TAs will have dedicated office hours for course material via Zoom (a link will be provided to you, but the session will not be recorded). Instructors' and TAs' office hours start on the week of Wednesday, September 16th, 2021. See Quercus for more information and any changes.

Online Academic Integrity Declaration Form:

The first question of every quiz, term test, and final examination will have a link to an Online Academic Integrity Declaration Form that students **MUST** fill out during the time of the term test or final examination.

Failure to fill out the Online Academic Integrity Declaration Form during the time of the term test or final examination will result in a mark of ZERO (0) on the assessment.

Last Date to drop course from Academic Record and GPA is November 10, 2021.