

University of Massachusetts at Amherst
Department of Mathematics and Statistics
Math 233 (4 credits, GenEd R2)
Course-wide Syllabus and Policies

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Please note: This syllabus is subject to change, according to any future circumstances or guidelines.

Course Description

Math 233 is the third semester of the Calculus sequence. It develops the extension of single-variable calculus to functions of several variables. In particular, it covers vectors in two- and three-dimensional space, partial derivatives, double and triple integrals, line integrals, and surface integrals. The culmination of the course is the generalization of the Fundamental Theorem of Calculus: Green's theorem, Stokes's theorem, and the Divergence Theorem.

Course Prerequisites

Math 132 or equivalent.

Course technical requirements

This course uses Canvas as Learning Management Systems (LMS) accessed through this link: [Learning Management Systems at UMass Amherst](#). All course materials will be posted on the LMS, but homework will be available through WebAssign (see information below). Students must be able to have access to their LMS account (with integrated WebAssign) and their UMass Gmail account.

Course webpage: <http://websites.umass.edu/math233-nikolaou/>

Textbook and WebAssign

The textbook for this course is Calculus: Early Transcendentals, 9th Edition by James Stewart. WebAssign is the platform used to deliver the homework assignments. In this web page: <https://www.cengage.com/coursepages/UMassMATH233Canvas>, you will find information on purchasing an access code (which includes access to the e-book of the course), renting/purchasing a hardbound copy of the textbook, the Cengage Mobile App (to get 24/7 online and offline access to your course, flashcards, study tools, etc), WebAssign Tips & Training Tools, Technical Support & Troubleshooting.

If you need help with homework enrollment or experience any technical difficulties with WebAssign, please contact WebAssign's Technical Support (contact information available in the above webpage).

Attendance policy

Attending class and participating is critical and beneficial to learning.

Students who are absent due to a university-approved conflict (such as religious observance, athletic event, field trip, performance), health reasons, family illness, or other excusable extenuating circumstances remain responsible for meeting all class requirements.

If you become ill, it is important that you recover before coming to class and have a negative test (if applicable). In such a case you should contact your instructor (for exams) and your discussion TA (for quizzes) to make alternative arrangements.

WebAssign Homework

There are 5 attempts at each question (except for true/false questions where there is only one attempt) on each WebAssign homework assignment. If you miss the deadline of a homework assignment, you can still complete the assignment up to 7 days after the due date, by requesting an automatic extension through WebAssign:

https://help.cengage.com/webassign/student_guide/webassign/t_s_making_automatic_extension_request.htm,

with a 30% penalty applied in the portion of the assignment not submitted by the due date.

Handwritten homework

You need to solve the homework posted in WebAssign using pen and paper. It is strongly recommended to download/print/write the problems in a piece of paper and turn off your computer/device and fully concentrate on your homework problems on pen and paper. Research has shown that pen and paper is the best practice for you to understand and learn the material. After you solve your homework you can go back to input answers in WebAssign and get feedback for correctness of your results (you can then go back to your handwritten homework notes and amend any issues). When you are done with the WebAssign homework you must upload this handwritten homework in Gradescope. Some weeks the handwritten homework will be graded for completeness and some weeks a few questions will be randomly chosen to be graded. Instructions on how to organize your handwritten homework can be found here:

<https://websites.umass.edu/math233-nikolaou/handwritten-homework/>

There are no extensions on the handwritten homework due dates set on Gradescope, except in cases of a documented emergency.

Please note that there are no extensions for the last sets of homework after their set due dates.

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There is no rescoring or partial credit for homework, for any reason.

Quizzes

There will be a quiz every week during discussions, based on the material covered during lectures the previous week. The lowest (1) quiz score will be dropped at the end of the semester, to accommodate for any reason a quiz might be missed.

Exams

This course will have two evening midterm exams and a final exam.

Tentative exam dates:

- Exam 1: ██████████ (location varies for different sections; check Canvas)
- Exam 2: ██████████ (location varies for different sections; check Canvas)
- Final Exam: ██████████

Sections covered on individual exams will be announced beforehand. The final exam will be cumulative, with some emphasis placed on topics covered since those on the second exam. There will be one or more review sessions before each exam. Zoom links and times will be announced by your instructor on Canvas.

Exam Policies

Please be aware of the exam rules:

- No calculators or any other electronic devices are allowed to be used during the exam.
- Phones must be turned off during the exam. Using a phone or other electronic device during the exam will be considered cheating and handled accordingly.
- No formula sheets, notes, or any materials with helpful information will be allowed during the exam.
- You must present your student ID when submitting your exam, so please bring your ID to the exam room. If you do not have your student ID you will not be allowed to submit your exam.
- If you arrive late to the exam, you might be allowed to participate in the exam. However, you will not be given extra time to complete the exam; all exams will end at the stated times. Please give yourself plenty of time to get settled in the exam room before the exam starts.

Make-up exam policy

Students are expected to take all three exams at the regularly scheduled times. Re-taking of exams is not allowed in this course for any reason: once an exam has been taken it cannot be retaken or made up.

Reasons for taking an exam at a different time are limited to the following:

1. Multiple evening exams at the same time

In case of evening exam conflict, you should fill out the Exam Conflict Form on Spire (*Student Home > Evening Exam Conflict*). To submit a final exam conflict form log into Spire > *Student Home > Final Exam Conflict*. Advance notice is required (see deadlines below). Failure to do this in a timely fashion may result in a zero on the examination.

For Exam 1 conflicts: notify your instructor by [REDACTED]

For Exam 2 conflicts: notify your instructor by [REDACTED]

For Final exam conflicts: notify your instructor by [REDACTED]

Students having a midterm exam conflict should expect to take a make-up exam the next day after the regularly scheduled midterm from 7-9 PM.

2. Medical problems

You must submit a statement from a medical professional. It is your right not to disclose any details, but we must be assured that you are medically incapable of taking the exam (the doctor's note should clearly state that you were unable, for medical reasons, to take the scheduled exam). If advance notice is possible and not given, your instructor may refuse your request. If you miss an exam due to illness and advance notice is not possible, your instructor must be notified within 24 hours of the missed exam.

3. Emergency absences from classes

Notify the Dean of Students' Office https://www.umass.edu/dean_students/. The Dean of Students office will then verify the details and notify each of your instructors.

4. Religious observances

State law and university regulations require that a student be excused from academic pursuits on days of religious observances. The exams as scheduled do not conflict with any observances of which we are aware. Any such claim requires notice from the student, in writing, at the beginning (first two weeks) of the semester.

5. Other circumstances

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In case of an exceptional event beyond those covered above, contact your instructor as soon as possible and explain the problem. (You should be prepared to provide a written statement.) The course chair and your instructor will evaluate the reasons that you have given and come to a decision. Depending on the circumstances, you might be able to take a late exam penalized by some percentage.

Make-up exams or early exams will not be given to accommodate travel plans.

Incomplete course grade

Students are expected to complete all assignments (quizzes and homework) and exams by their due dates. Students who are unable to complete course requirements within the allotted time due to severe medical or personal problems may request a grade of Incomplete from the instructor of the course. Incomplete grades are warranted only if a student is passing the course at the time of the request and if the course requirements can be completed by the end of the following semester.

If you are entitled to an "incomplete" in the course, you must complete an Incomplete Grade Form - you can get this form from the Academic Dean. All incomplete course assignments must be completed within a timeframe agreed between the instructor and student. An incomplete counts as an "F" until you complete the work and a grade is submitted. You only have one semester to complete the work, or the "INC" becomes an "F".

Grading policy

Letter grades for all Math 233 sections will be determined as follows:

Course Component	Weight
Exam 1	25%
Exam 2	25%
Final Exam	30%
WebAssign Homework	8%
Written Homework	4%
Quizzes	8%

If your final exam score exceeds the average of your Exam 1 and Exam 2 scores, then your final exam will count 35% (instead of 30%) and each of Exams 1 and 2 will count 22.5% (instead of 25%).

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After being determined by the above algorithm, as per the grading policy of the Department of Mathematics and Statistics, the total score will be truncated *down* to the nearest integer less than or equal to the total score. (Note that truncation is not the same as rounding. For example, a score of 89.75 will be truncated to 89, not rounded to 90.) The letter grade will then be determined by the following scale:

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
	90	87	83	79	75	71	67	63	59	55	<55

Disability Services – Accommodations

The University of Massachusetts is committed to providing an equal educational opportunity for all students. A student with a documented physical, psychological, or learning disability on file with Disability Services may be eligible for reasonable accommodations to succeed in this course. Such students should obtain documentation from the Office of Disability Services and inform the instructor **at least two weeks** before the exams or assignment for which the accommodation is required. Accommodations can be scheduled through: <https://www.umass.edu/disability/students>. Please contact your instructor if any special arrangements should be made. Students receiving accommodations for exams will take their midterm exams starting at 5 PM on the days of the regularly scheduled midterm exams. The final exam will be taken with the Disability Services office and **must be scheduled by the student at least three weeks in advance of the finals period.**

Course Support

The best way to get any questions about content answered is through the instructor and the Calculus Tutoring Center (CTC). CTC has drop-in hours beginning from the second week of the semester and operates on a first-come first-serve basis. Schedules and links can be found on your section's Canvas page. Another option is to attend the supplemental instruction (SI) sessions (you should see a separate page with information on Math 233 SI sessions, meeting times etc. in your Canvas account) or visit the Learning Resource Center, where you may find free tutors who can help with Math 233 materials. Hours of available tutors can be found through the center's website: <http://www.umass.edu/lrc/>.

Dropping the course

It is the student's responsibility to understand when they need to consider unenrolling from a course, based on their performance, program requirements, academic status and personal circumstances.

Below are some important deadlines:

Add/drop deadline: [REDACTED]

Last day to drop with 'W' and select 'P/F': [REDACTED]

Last day of classes: [REDACTED]

Academic Honesty Policy

Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty.

Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent (http://www.umass.edu/dean_students/codeofconduct/acadhonesty/).

Chegg, CourseHero, Discord, ChatGPT and other online help resources: Seeking answers from any website is a clear violation of the academic honesty policy, while submitting course materials to these sites or similar ones is a violation of the instructor's, the University's, and the publisher's copyright.

Title IX Statement

In accordance with Title IX of the Education Amendments of 1972 that prohibits gender-based discrimination in educational settings that receive federal funds, the University of Massachusetts Amherst is committed to providing a safe learning environment for all students, free from all forms of discrimination, including sexual assault, sexual harassment, domestic violence, dating violence, stalking, and retaliation. This includes interactions in person or online through digital platforms and social media. Title IX also protects against discrimination on the basis of pregnancy, childbirth, false pregnancy, miscarriage, abortion, or related conditions, including recovery. There are resources here on campus to support you. A summary of the available Title IX resources (confidential and non-confidential) can be found at the following link: <https://www.umass.edu/titleix/resources>. You do not need to make a formal report to access them. If you need immediate support, you are not alone. Free and confidential support is available 24 hours a day / 7 days a week / 365 days a year at the SASA Hotline 413-545-0800.

Course Topics

Chapter 12. Vectors and the Geometry of Space

- 12.1 Three-dimensional Coordinate Systems
- 12.2 Vector
- 12.3 The Dot Product
- 12.4 The Cross Product
- 12.5 Equations of Lines and Planes
- 12.6 Cylinders and Quadric surfaces

Chapter 13. Vector functions

- 10.1 Parametric equations (review)
- 13.1 Vector Functions and Space Curves
- 13.2 Derivatives and Integrals of Vector Functions
- 13.3 Arc Length
- 13.4 Motion in Space: Velocity and Acceleration

Chapter 14. Partial derivatives

- 14.1 Functions of Several Variables
- 14.2 Limits and Continuity
- 14.3 Partial Derivatives
- 14.4 Tangent Planes and 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

Chapter 15. Multiple integrals

- 15.1 Double Integrals over Rectangles
- 15.2 Double Integrals over General Regions
- 10.3 Polar Coordinates (review)
- 15.3 Double Integrals in Polar Coordinates
- 15.5 Surface Area
- 15.6 Triple Integrals
- 15.7 Triple Integrals in Cylindrical Coordinates
- 15.8 Triple Integrals in Spherical Coordinates

Chapter 16. Vector Calculus

- 16.1 Vector fields
- 16.2 Line integrals
- 16.3 The Fundamental Theorem for Line Integrals
- 16.4 Green's theorem
- 16.5 Curl and Divergence
- 16.6 Parametric Surfaces and Their Areas (time permitting)
- 16.7 Surface Integral
- 16.8 Stokes' Theorem
- 16.9 The Divergence Theorem

Course Schedule

Tentative schedule for Math 233, ██████████

Week of:	Textbook Sections	Notes
Sep 2	12.1, 12.2, 12.3	██████████ First day of classes
Sep 9	12.4, 12.5, 12.6	██████████ Last day to add or drop any class
Sep 16	10.1(review), 13.1, 13.2, 13.3	
Sep 23	13.4, 14.1, 14.2	
Sep 30	14.3, 14.4, 14.5	
Oct 7	14.6, 14.7, 14.8	
Oct 14	14.8 (cont'd), 15.1, 15.2	██ ██ ██
Oct 21	10.3 (review), 15.3, 15.5, 15.6	
Oct 28	15.7, 15.8	██████████ Last day to Drop with 'W' or select 'P/F'
Nov 4	15.8 (cont'd), 16.1	██
Nov 11	16.2, 16.3	██████████ Holiday - Veterans' Day ██
Nov 18	16.4, 16.5	
Nov 25	(16.6), 16.7	██████████ Thanksgiving recess begins after last class
Dec 2	16.8, 16.9	██████████ Classes resume
Dec 9	Review	██████████ Last day of classes
Dec 12-18		Final examinations ██

Gen Ed Statement

MATH 233 is a four-credit General Education course that satisfies the R1 (Basic Math Skills) and R2 (Analytic Reasoning) general education requirements for graduation. The General Education Program at the University of Massachusetts Amherst offers students a unique opportunity to develop critical thinking, communication, and learning skills that will benefit them for a lifetime.

Learning Outcomes for all General Education courses

Math 233 satisfies the following General Education objectives:

- *Content:* Students will further their Calculus understanding by applying the analysis of single variable functions learned in previous calculus courses to functions of multiple variables.
- *Critical Thinking:* Students will use mathematical models to understand rates of change and cumulative change in dynamic systems, and employ computational skills to find these rates of change and cumulative change efficiently.
- *Communication:* Students will develop their writing skills by articulating their reasoning of computations through a sequence of logical steps.
- *Contextualizing:* Students will apply the theoretical concepts of calculus to real-world and theoretical problems, such as finding the position or distance traveled of an object moving in three dimensional space, or using density functions to calculate total mass, total charge, or total probability.

Learning Outcomes for the R1 and R2 Designations

Because Math 233 presupposes basic math skills, it carries the designation for the Basic Math Skills requirement (R1). In addition, the course satisfies the following objectives of the Analytic Reasoning requirement (R2):

- *Advance a student's formal or mathematical reasoning skills beyond the level of basic competence:* In learning calculus in Math 233, students will think critically and advance their mathematical literacy and analytical skills by learning to extend previous theories in Calculus to higher dimensional spaces.
- *Increase the student's sophistication as a consumer of numerical information:* Students will connect the ideas of rates of change and cumulative change to various disciplines such as physics, statistics, economics, and engineering by analyzing and solving problems in both real life and theoretical applications.
- *Indicate the limits of formal, numerical, quantitative, or analytical reasoning and discuss the potential for the abuse of numerical arguments:* Students will learn methods of both estimating and computing cumulative change. Students will analyze when it is appropriate to use an estimation and be able to gauge the accuracy of their estimations.