AMAT 112: Calculus I

Departmental Syllabus

This is a dynamic document subject to updates. Any major changes will be communicated.

Calculus I is a coordinated course. This syllabus contains information shared across all sections. Your instructor will also provide a syllabus supplement that contains information specific to your section.

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Course Description

This course explores limits and differentiation, focusing on their applications and modeling in real-world problems. We'll introduce a library of single-variable functions from a modeling perspective, and discuss limits and continuity of functions at points and over intervals. The concept of the derivative and its interpretation as an instantaneous rate of change will be covered. You'll learn derivatives of elementary precalculus functions, along with rules for differentiating products, quotients, composite, inverse, and implicitly defined functions. Applications of the derivative to optimization, geometry, modeling, and indeterminate forms will be explored. The course concludes with an introduction to the definite integral and the fundamental theorem of calculus.

General Education and Prerequisites

AMAT 112 fulfills 4 credits of the General Education Requirement.

AMAT100 or precalculus at the high school or college level is a prerequisite for this course.

Recommended Textbook

Calculus Volume 1 by Openstax (Available freely for download at https://openstax.org/details/books/calculus-volume-1).

Learning Outcomes

By the end of the course, students will be able to:

- Understand the theoretical concept of a limit; use algebraic means to compute the values of limits and identify when they don't exist.
- Understand the theoretical concept of continuity of a function at a point and over an interval. Be able to identify different types of points of discontinuity

and use the limit definition to demonstrate continuity of a piece-wise defined function.

- Understand the theoretical concept of the derivative; compute them using the standard rules of differentiation.
- Understand the definite integral as a limit of Riemann sums and establish the connection between the derivative and the definite integral through the Fundamental Theorem of Calculus.
- Apply knowledge of calculus, such as integration and differentiation, to solve real-world problems and understand how these mathematical concepts model and help us investigate the physical world.
- Effectively convey mathematical ideas, including the ability to comprehend, construct, and evaluate mathematical arguments.

Course Structure and Assessments

The course blends interactive lectures with hands-on practice to help students master essential mathematical concepts.

- **Lectures:** Active participation and problem-solving are emphasized in three 75-minute sessions held each week.
- **Online Homework:** Regular assignments are designed to reinforce students' understanding of calculus concepts and techniques, and to help them identify areas for further review.
- **Quizzes:** Weekly quizzes are formative assessments that test students' comprehension of current material, ensuring their engagement and providing exam-like experience.
- **Exams:** Students' understanding will be evaluated through three midterm exams and an **optional** cumulative final exam, which can potentially improve their grade.

- **In-class Practice Problems:** These collaborative exercises allow students' to apply their knowledge and receive immediate feedback.

Comprehensive Assessments: Exams will draw upon concepts covered in lectures, online homework, quizzes, and practice problems, providing a well-rounded assessment of students' learning.

Homework

Regular online homework assignments are due at 11:59 PM on their assigned dates (see the course Lecture Schedule).

- **Submissions:** There are 10 submissions for open-ended questions. Multiple-choice questions have limited submissions (typically one or two fewer than the number of answer choices).
- **Late Passes:** All students have 5 "Late Passes" to extend homework deadlines by *one week*. Use these strategically when you need extra time due to a busy week or unexpected challenges.

Late Passes offer students flexibility and aid in effective workload management throughout the semester.

The lowest three homework scores will be dropped.

Quizzes

Weekly quizzes will be administered at the beginning of the last lecture of the week. For example, at the start of Friday's lecture for MWF Sections or Thursday for MTTh Sections. Quizzes are formative assessments to test students' understanding of the material. The purpose of quizzes is to ensure students are understanding the material currently being covered and discussed in class and to ensure they are involved throughout the semester. In addition, the quizzes will allow students to experience an exam-like environment.

The two lowest quiz scores will be dropped.

Supplemental Instruction (SI) and UUNI-90

This course is supported by the Supplemental Instruction (SI) Program through the Learning Commons. SI offers free, peer-led study sessions designed to enhance your understanding of course material and develop academic skills. Students enrolled in SI are also registered in a UUNI-90 academic support course (non-credit, pass/fail, not listed on your transcript). Your SI Leader attends classes, hosts weekly sessions, and helps you prepare for quizzes, midterms, and finals. Participation is highly encouraged. For more information and session schedules, please visit: albany.edu/tutoring/access-tutoring-resources/supplemental-instruction-si.

Grade Calculation

Students' final numeric course grades are determined using two formulas; the formula yielding the higher grade will be applied.

- **Formula 1: Drop lowest midterm (Final Exam Required)**

10% Quiz, 10% Homework, 25% Highest Midterm, 25% Second-highest Midterm, 30% *Final Exam

*A student who passes the final exam with a 50% or higher is awarded at least a passing grade ('D') for the course even if their numeric grade is below a 50.

- **Formula 2: No final exam**

10% Quiz, 10% Homework, 80% of Average of (Exam 1, Exam 2, Exam 3)

We will convert Numeric Grades to Letter Grades based on the table:

Grade	A	A-	B+	B	B-	C+
Range	[100, 90]	(90, 87]	(87, 83]	(83, 80]	(80, 75]	(75, 70]
Grade	C	D	E			
Range	(70, 60]	(60, 50]	< 50			

These cutoffs might be adjusted, but only in the downward direction (to make letter grades higher).

Attendance Policy

Students are expected to attend all scheduled classes. Your attendance is crucial not only for your own learning and success but also for creating a productive and engaging environment for all students in the class.

Our course policy is that if a student fails to attend at least 75 percent of the total class sessions, the instructor may exercise the option to fail that student or decrease their final course letter grade by one full letter grade.

Exam Policies

There are **three midterm exams** and an **optional final exam** during the semester. The dates of these exams are listed on the course lecture schedule with the exception of the final exam, which is determined by the registrar and published after the mid-point of the semester.

The purpose of the exams is to test students' understanding of the course material in a summative, holistic approach. Some problems may involve multiple concepts.

During exams, NO CALCULATORS, no cell phones, iPads or other devices that can communicate with the internet or with others may be used. Any such equipment found with the power on may well be interpreted as “cheating”. The Department of Mathematics and Statistics reserves the right to impose the strongest academic sanctions for violations of Academic Integrity. See the policy on Academic Integrity below.

Out-of-sequence exams will only be accommodated in the following cases:

- A documented medical excuse.
- A University sponsored event such as an athletic tournament, a play, or a musical performance. Athletic practices and rehearsals do not fall into this category. Please have your coach, conductor, or other faculty advisor contact your instructor.
- A religious holiday.
- Extreme hardship such as a family emergency.
- We will not be able to accommodate out-of-sequence exams for purposes of more convenient travel, including already purchased tickets.

Scheduled out-of-sequence exams (those not arising from emergencies) must be taken before the actual exam. **Make-up exams must occur within one week of the regularly scheduled exam, otherwise a zero score will be given.**

If you missed an exam for any of the above reasons, notify the course instructor immediately.

Other Important Information

Academic Integrity

All students are expected to abide by the UAlbany Standards for Academic Integrity to be found in the **Standards of Academic Integrity** page. Academic integrity is part of your reputation as a responsible student and adult. Violations of the policy are a breach of the trust between professor and student. It is unfair to your fellow students, to the faculty, and to yourself.
Academic integrity violations include:

- Copying answers from computational tools or large language models (e.g., Wolfram Alpha, Symbolab, ChatGPT). While technology can be used to check work, submitting unoriginal solutions undermines the learning process.
- Copying answers from other websites (e.g., Chegg, Math Stack Exchange, Yahoo! Answers). Graders and instructors can detect copied work, and students who bypass the objectives of the homework process often perform poorly on quizzes and exams.
- Sharing answers with other students.
- Having another person take a quiz or exam on your behalf.
- Altering graded work to inflate scores.
- Fabricating excuses or forging documentation for make-up exams.

This list is not exhaustive. Submitting unoriginal work with intent to deceive prevents the instructor from evaluating a student's learning and typically results in a zero score, along with a report to the relevant dean for disciplinary action.

AI Policy

AI can be a powerful ally in your learning journey. Think of it as a study partner—a tool to help you **check your work, explore different approaches**, and **delve deeper into the "why"** behind solutions. The goal is to let it enhance your understanding,

not replace your own effort. Always try solving problems independently first, then use AI for support and verification.

Acceptable Uses of AI

- **Checking your work**: After you've completed a problem, use an AI tool to confirm your final answer or to review the steps of a solution.
- **Exploring different methods**: If you're stuck, ask an AI to provide an alternative way to solve a problem. This helps you see how different concepts connect.
- **Deepening your understanding**: Use AI to ask "what if" questions or to get a simplified explanation of a complex topic or theorem. For example, "Explain the chain rule using a real-world analogy."

Unacceptable Uses of AI

The work you submit in this course must be a genuine reflection of your own learning and problem-solving skills. Using AI to generate solutions for assignments, quizzes, or exams without first attempting the problem yourself is a violation of academic integrity. **Submitting AI-generated work as your own is strictly prohibited.**

Disability Disclosure Statement

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, medical, cognitive, learning and/or mental health (psychiatric) disabilities. If you believe you have a disability and require accommodation in this class, please register with Disability Access and Inclusion Student Services (DAISS). You can contact DAISS at daiss@albany.edu, 518-442 -5501 or www.albany.edu/disability. Once you have registered with DAISS, they will provide you with an accommodation letter that you can send to your instructors to receive your approved accommodation.

Basic Needs Statement

It is difficult to succeed academically if you don't have enough to eat, a safe place to live and sleep, or are struggling with an unforeseen emergency. Knowing the resources available on your campus to help you succeed is key! If you need help meeting these or other basic needs, please seek assistance from Supplemental Support Services in the Dean of Students Office. View the basic needs assistance offerings at https://www.albany.edu/dean-students/supplemental-support-services. While you're there, see the variety of helpful services available to you at the Dean of

Students at https://www.albany.edu/dean-students. Resources and reporting links can be found on both of these websites.

Mental Health Resources

As a student, there may be times when personal stressors interfere with your academic performance and/or negatively impact your daily life. The University at Albany Counseling and Psychological Services (CAPS) provides free, confidential services including individual and group psychological counseling and evaluation for emotional, social and academic concerns. Students may consult with CAPS staff remotely by telephone, email or Zoom appointments regarding issues that impact them or someone they care about.

- For questions or to make an appointment, call (518) 442-5800 or email consultation@albany.edu. Visit www.albany.edu/caps for hours and additional information.
- If your life or someone else's life is in danger, please call 911. If you are in a crisis and need help right away, please call the National Suicide Prevention Lifeline at 988.
- Students dealing with heightened feelings of sadness or hopelessness, increased anxiety, or thoughts of suicide may also text "HOME" to 741741 (Crisis Text Line).

https://988lifeline.org/? scrlybrkr=4617837b
https://www.albany.edu/health-well- being/emergencies