Math 101: Single Variable Calculus I
Spring 2026, Section 1

Instructor:	Ethan Gwaltney	**Class Time:**	MWF 11-11:50am
Email:	gwaltney@rice.edu	**Office Hours:**	T 12:30-1:30, W 1:30-2:30, F 2:30-3:30
Office:	HBH 322	**Websites:**	Canvas, Gradescope, WebAssign
Classroom:	HBH B21	**Study Sessions:**	MWF 4-5pm, HBH B21

A theme running through all mathematics is replacing a hard problem with an easier one. In a sense, calculus is all about taking hard problems concerning *nonlinear* functions and shapes and replacing them with easier problems concerning *linear* functions and shapes. Since we understand linear functions and shapes very well, this is a powerful substitution and opens up many new theoretical questions and applications. This general idea goes back at least to Archimedes! But for most functions, replacing them with a line (even carefully chosen best-fit lines) sacrifices accuracy, so how exactly should we pass from nonlinearity to linearity?

In this course, we'll learn that by using limits to zoom in very closely, we can 'find lines' in most of the nonlinear functions you've worked with before. We will then harness our understanding of simple linear functions and shapes to pose and solve many previously unapproachable problems, e.g., how to approximate a function's value at an awkward input like $\pi + 0.001$, how to find a function's minimum or maximum value, and how to compute volumes of wildly irregular solids.[1]

Contents

[1] This syllabus is subject to change. Significant changes will be announced on Canvas.

Course Description

Prerequisites

We do not assume that you have seen calculus before. A working knowledge of pre-calculus at the high school level is assumed. If this concerns you, talk to me about MATH 110.

Course Materials

- **Textbook:** *Calculus: Early Transcendentals, the 9th edition*, by Ian Stewart. An e-book version of this text is provided with your purchase of WebAssign (see below).
- *WebAssign* is an online homework platform, and is **required to be purchased** in order to complete the online homework for this course. *Talk to me if you have already purchased WebAssign for a different course, because you likely do not need to pay again*. You can access WebAssign via Canvas.

  If you plan to take further math and physics courses at Rice (e.g., MATH 102), I recommend you purchase the 4 year access to WebAssign from the Rice University Bookstore for $120. A cheaper option for this semester may be available, but anything besides the $120 option will result in a second payment if a later course also uses WebAssign.[2]
- *edge.edX.org* is a free learning platform where the online learning sequences will be posted. You will receive an email enrolling you by Tuesday, Jan 13. If not, contact me.
- All assignments and important announcements will be posted on *Canvas*.
- *Piazza* is a tool on Canvas for asking/answering questions and working collaboratively.
- *Gradescope* is a grading platform where you will upload your written homework. You will also receive detailed feedback on your written HW, quizzes, and exams through Gradescope, which is also equipped with a regrade request feature. You can also find Gradescope on Canvas.

Key Learning Goals

The main topics of this course are:

CI-1 limits and continuity of functions
CI-2 definition and interpretation of the derivative
CI-3 applications of derivatives
CI-4 calculating derivatives
CI-5 understanding functions using calculus
CI-6 optimization and related rates
CI-7 definition and interpretation of the integral
CI-8 The fundamental theorem of calculus
CI-9 applications of integrals

[2] Need financial aid purchasing this textbook? See the Rice Access and Opportunity Portal.

Lesson Schedule

	Learning Objectives:	Text:	Day:
CI-1:	**Limits and continuity.** Evaluate limits algebraically, graphically, and/or numerically. Geometrically interpret limits and continuity. Determine if a function is continuous at a point or over an interval. Describe and interpret real-world functions in terms of continuity. Apply the Intermediate Value Theorem.	*2.2-2.3, 2.5*	1-6
CI-2:	**Defining the derivative.** Use the limit definition to compute derivatives. Geometrically interpret the derivative. Describe and interpret real-world scenarios using derivatives.	*2.7-2.8*	7-10
CI-3:	**Applications of the derivative** Describe and interpret higher derivatives. Compute various derivatives of common functions. Estimate functions using linear approximation.	*3.1, 3.3, 3.10*	11-15
	Midterm 1		**February 19**
CI-4:	**Calculating derivatives.** Identify and apply various derivative rules, including the chain rule. Compute derivatives using implicit differentiation. Combine multiple derivative rules. Apply the inverse function theorem.	*3.2, 3.4-3.6*	16-21
CI-5:	**Understanding functions via calculus.** Use the Extreme Value Theorem to identify and classify local extrema. Sketch the shape of a function using its first two derivatives. Describe asymptotic behavior of functions. Evaluate limits at infinity and resolve indeterminate forms. State and apply L'Hôpital's rule when appropriate.	*2.6, 4.2-4.4*	22-26
CI-6:	**Optimization and related rates.** Describe and solve real-world problems using optimization. Describe and interpret real-world scenarios using related rates.	*3.9, 4.1, 4.7*	27-30
	Midterm 2		**April 2**
CI-7:	**Defining the integral.** Approximate the area under a curve using Riemann sums. Describe the relationship between limits and definite integrals. Compute integrals using antiderivatives. Describe and interpret real-world scenarios using integrals.	*5.1-5.2, 5.4*	31-33
CI-8:	**The fundamental theorem of calculus.** Describe the relationship between derivatives and integrals. Apply the fundamental theorem of calculus to evaluate integrals. Compare and connect various interpretations of the integral.	*4.9, 5.3*	34-36
CI-9:	**Applications of integrals.** Construct and evaluate integrals that represent real-world concepts, including area, volume, work, cost, mass density, etc.	*6.1-6.3*	37-40
	Final Exam		**May 4**

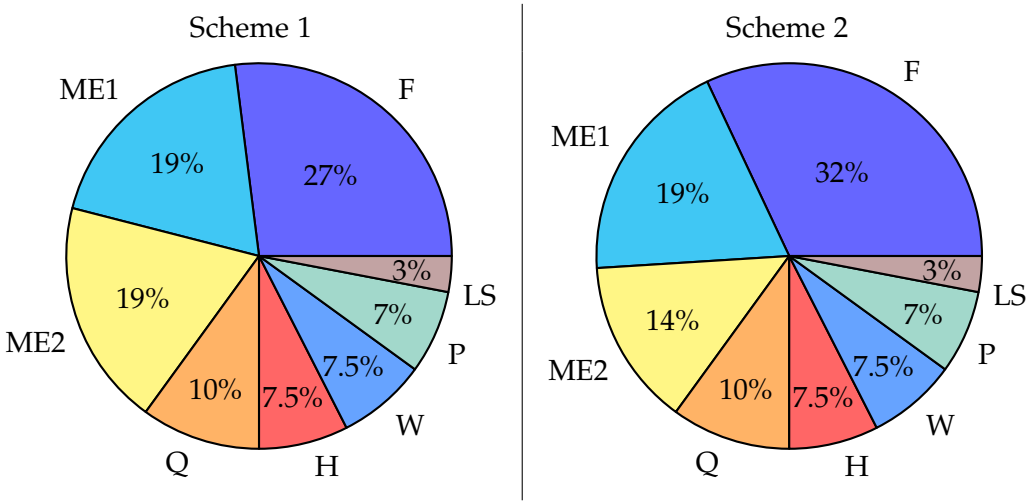
Course Structure

Grading Policy

We will assess progress using the following tools:

1. **Exams, 65% of your grade** There will be two midterm exams (ME) and one final exam (F). In the pie charts below, the midterm on which you score higher is ME1, the one on which you score lower, ME2. See the calendar below for exam dates.
2. **Homework, 15% of your grade:** Your homework grade is divided evenly between WebAssign HW (W) and Handwritten HW (H). Most lessons will have related WebAssign HW due the night before the following class; these provide immediate feedback to help you identify any misunderstandings of course content quickly. Your lowest six WebAssigns will be dropped. Handwritten HW will receive detailed feedback and will generally be due to Gradescope on Fridays at 11:59pm. Your lowest two Handwritten HW will be dropped.
3. **Quizzes, 10% of your grade:** Most weeks will have a short quiz (Q) during the (usually Monday) lesson. These low-stakes quizzes are designed to help you monitor your developing ability to demonstrate your learning. Your lowest two quiz grades will be dropped.
4. **Learning sequences & Participation, 10% of your grade:** Most lessons will have an online sequence (LS) of videos and problems on edge.edX.org to be completed before class. These materials are essential to prepare you for lecture/in-class activities. If you earn over 80% of the total available points by the end of the semester, you will receive full marks for learning sequences (3% of your overall grade). The remaining 7% of your grade coming from this section is earned by participating in various humanizing activities (P). See below for details.

Your grade will reflect your performance in the course using whichever of the following two grading schemes results in a *higher* grade for you.



A letter grade will be assigned to percentages via the following brackets.

F	D-	D	D+	C-	C
$[0, 60)$	$[60, 63.\bar{3})$	$[63.\bar{3}, 66.\bar{6})$	$[66.\bar{6}, 70)$	$[70, 73.\bar{3})$	$[73.\bar{3}, 76.\bar{6})$
C+	B-	B	B+	A-	A
$[76.\bar{6}, 80)$	$[80, 83.\bar{3})$	$[83.\bar{3}, 86.\bar{6})$	$[86.\bar{6}, 90)$	$[90, 93.\bar{3})$	$[93.\bar{3}, 100]$

I reserve the right to award A+ for exceptional engagement and performance. I reserve the right to adjust the grade cutoffs at the end of the semester. Any change I make will only make it *easier* to obtain a certain letter grade.

Rice Honor Code

You have pledged to uphold the Rice Honor Code. Follow the below instructions on collaboration to abide by the Rice Honor Code in this course.

- For the online learning sequences, you should work individually. Outside assistance should be limited to asking questions (Piazza!) about parts of videos that you did not understand.
- On WebAssign HW, you may only use your textbook, notes, and previous assignments. You may also work with your peers.
- For Handwritten HW, you should do your best to solve problems individually *at first*. Then you are encouraged to collaborate and work together with your MATH 101 peers. You must write and submit your solutions individually. When you collaborate, note the names of collaborators. By default, internet (aside from WebAssign) and AI resources are off limits; if you believe these resources may be used to enhance your learning, contact me directly.
- For quizzes and exams, no calculators or external resources are permitted. Your work must be solely your own.

Participation

Your participation grade will be calculated via **participation points** (PP). Each PP is worth 0.1% of your grade (up to a maximum of 7%). Thus, you need to earn 70 PP to earn full marks in participation. There are several ways to participate in this course in and outside of lessons, including:

- Completing the first day survey and other course surveys
- Attending office hours, MMT, drop-in study, or study sessions (see below)
- Asking or answering a math question on Piazza

The purpose of PP is to incentivize your cultivation of healthy study habits. The earlier you build these habits in the semester, the better, so, out-of-class activities earlier in the semester are worth more PP. In particular,

Period of semester	Activity	PP/activity
Pre-midterm 1	Office hour, MMT, Study Session, Drop-in	3
Between midterms	Office hour, MMT, Study Session, Drop-in	2
Post-midterm 2	Office hour, MMT, Study Session, Drop-in	1
Any time of semester	Piazza, Check-ins, Surveys	1

I will make clear when an activity is eligible to earn participation points and update your progress weekly on Canvas. Everyone should be able to earn the full participation grade. As an additional incentive, **up to 1% extra credit for the course is available by accruing more than 70 PP**; that is, 80 PP will earn you 8 points towards your course grade.

Policies

Hospitality in the classroom

My ideal for the classroom is one in which every student is excited about the course and feels welcome. We might think of me as a host—I "set the tone" and "decide the meal," and, if I'm a good host, I make you feel welcome. This vision motivates several of the design elements for the course, including my endorsement of the Departmental Statement of Conduct below, which imposes responsibilities on students as well as instructors. If you have comments, concerns, suggestions, etc., please email me directly. If anonymity is required, use this Google form instead.

Statement of Conduct: The Department of Mathematics supports an inclusive learning environment where diversity and individual differences are understood, respected, and recognized as a source of strength. Racism, discrimination, harassment, and bullying will not be tolerated. All students and faculty are expected to treat each other with courtesy and respect, and to adhere to the Mathematics department standards of collegiality, respect, and sensitivity as well as the Rice Student Code of Conduct. If you think you have experienced or witnessed unprofessional or antagonistic behavior, then the matter should be brought to the attention of the instructor and/or department chair. The Ombudsperson is also available as an intermediate, informal option, and contacting them will not necessarily trigger a formal inquiry.

Attendance Policy

Attendance at our MWF lessons is required in the sense that assignments that affect your grade will be given in class. You are responsible for all the material and announcements covered in class, *including any class you miss*. Consistently attending class is the best way to ensure that you do not fall behind; when attendance is not possible, retrieve notes from a friend and review the relevant section(s) of the text. No Zoom offering is available, nor will I post notes.

Late/Missed Assignment Policy

- **Online learning sequences:** These materials are essential to prepare you for lecture/in-class activities, and so *no late submissions will be accepted*. However, remember that you only need to earn 80% of the total available points by the end of the semester to earn full credit.
- **WebAssign Homework:** After the posted deadline, you will be able to see detailed, step-by-step solutions on how to solve the assigned problems. Therefore, *no late submissions will be accepted*. However, your lowest six WebAssign HW scores will be dropped.
- **Handwritten Homework:** There is a 48-hour grace period for submitting handwritten homework to Gradescope after the posted deadline. There is no penalty for using this grace period, and you do not need to notify me of its use. No late homework will be accepted after this 48-hour late deadline. We drop your lowest two handwritten HW scores.
- **Quizzes:** My goal is to grade the quizzes within 24 hours, so that you have detailed feedback on your understanding of the material. Therefore, **it is not possible to make up a missed quiz**. However, your lowest two quiz grades will be dropped.

If you are having consistent problems keeping to the schedule, or if you find yourself struggling with unexpected personal events, I encourage you to reach out and email me (gwaltney@rice.edu) as soon as possible. Depending on the situation, I may grant flexibility on a case-by-case basis.

Regrading Policy

Occasionally, graders (including me!) may make a mistake. You should inspect your returned assignments carefully, and, if you find an error, you should submit a Regrade Request within one week after the assignment or exam has been returned. Please be sure to double check that a perceived error is a true error *before* submitting your request.

Calculator Policy

You are welcome to use calculators or Wolfram Alpha (a free online calculator) on homework unless indicated otherwise. However, no calculators will be allowed on any of the exams (or individual quizzes) in this course. I generally prefer to assign HW problems that do not require calculators, just like the exam problems. If you find yourself leaning too heavily on a calculator, you should consider weaning yourself off your calculator in order to better prepare you for exams (which are worth far more than any HW!).

Contact / Email policy

If you have a course-related question, you are strongly encouraged to post in the course Piazza before emailing me. Others might be able to answer your question, and others might find the answer to your question helpful as well. When you do email me, I will do my best to respond to your email in a timely manner (during the work-week, typically within 24 hours).

Resources

Office Hours

Office hours are dedicated times for you to ask me any and all questions that you have (about course content, mathematics, careers, life at Rice, or life in general). Coming to office hours is a great way to earn participation points! Note you are welcome to schedule an appointment if the posted hours don't fit your schedule, or if you'd like to have a private conversation–just email me to schedule.

Calculus Resources

Study Sessions:

Study sessions are times to work with your peers under the guidance of faculty (e.g., me!). The are held MWF from 4-5 PM in HBH 021.

Drop-in Peer Tutoring:

Rice's Office of Academic Support for Undergraduate Students (OASUS) offers free peer tutoring for our course all semester long! See the table below for the schedule. This is a great resource for homework help and content related questions throughout the semester. For more information, see the Drop-in webpage.

Midweek Math Training:

Written exams are worth a lot in this course! Taking an exam is a kind of performance, and just like any performance, it's important to practice. The Midweek Math Trainings offer (in addition

to snacks and drinks!) a form of practice designed to closely mimic a real exam day. For our course, MMT will be offered twice prior to each exam, and details will be announced in class and on Canvas a week or two before the corresponding exam date.

Previous Exams

You can use this bank of exams from previous courses to practice for this semester's exams. I highly recommend this, despite the fact that the exam for our course will be different.

Services for Students with Disabilities

The Americans with Disabilities Act requires that all qualified persons should have equal opportunity and access to education regardless of the presence of any disabling conditions. Any student with a documented disability who needs academic accommodations should 1) visit the Disabilities Resource Center (DRC) to make sure that the required documentation is on file and 2) speak to the instructor as soon as possible. The DRC is located in Allen Center 111, and can also be reached at adarice@rice.edu.

Mental Health Resources

Your wellbeing and mental health is important. The Wellbeing and Counseling Center provides cost-free mental health services to help you manage personal challenges that threaten your personal or academic well-being. The Center is located in the Gibbs Wellness Center and can be reached at 713-348-3311 (available 24/7).

Further Resources

- The Access and Opportunity portal website has financial support for:
  - academic, social, and professional opportunities (including WebAssign!)
  - participation in Residential College or university life
  - **emergency funds** for students in crisis (e.g. impending eviction or emergency surgery)
- Rice University supports your college experience by providing a variety of resources:
  - Other access and opportunity resources at Rice.
  - A list of campus resources from the Office of Student Success Initiatives.

Title IX

At Rice University, unlawful discrimination in any form, including sexual misconduct, is prohibited under Rice Policy on Harassment and Sexual Harassment (Policy 830) and the Student Code of Conduct. Please be aware that all employees of Rice University are "mandatory reporters," which means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, I must share that information with the Title IX Coordinator. Nevertheless, you will control how your case will be handled, including whether or not you wish to pursue a formal complaint.

To report sexual harassment, please contact the Title IX Coordinator at titleix@rice.edu. To explore supportive measures and other resources that are available to you, please visit the Office if Interpersonal Misconduct Prevention and Support at safe.rice.edu.