

# Math 1231-11: Single-Variable Calculus I

Spring 2026

**Lectures:** Tuesday/Thursday 4:45 – 6:00 PM COR 101A

**Recitations:** 33: W 8:00 AM – 8:50 AM ROME 351

34: W 9:35 AM – 10:25 AM TOMP 310

35: W 11:10 AM – 12:00 PM MON 351

**Textbook:** OpenStax *Calculus Volume 1* by Gilbert Strang and Edwin Herman

**Instructor:** Harold Sultan

**Email:** harold.sultan@gwu.edu

**Office:** Phillips 728C

**Office hours:** T 6:00PM-7:00PM (or by appt) M 10:00AM-12:00PM

**TA:** Jeremias Valenzuela Morales

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Phillips 724A

Also available, M 5:00-6:00pm Calc Lab in Rome 771

## Textbook

The official textbook for Math 1231 is OpenStax *Calculus Volume 1* by Gilbert Strang and Edwin Herman. It is available for free online at <https://openstax.org/details/books/calculus-volume-1>. I will be loosely following the textbook, but will often be giving my own take or focusing on topics the textbook doesn't emphasize.

I will be assigning online homework through the WeBWorK web platform. You can log into WeBWorK by following the link on Blackboard. Once you've followed the Blackboard link, you can create a password so you can log in directly, but you can also continue to access it from Blackboard. This service is hosted by GW and is free.

## Course content

This is the first semester of a standard year-long sequence in single-variable calculus. The main topics are limits and continuity; differentiation and integration of algebraic and trigonometric functions; and applications of these ideas. This corresponds roughly to Chapters 1–6 of Herman–Strang.

## Prerequisites

Students must have received a score of 76 or above on the ALEKS placement exam to register for 1231. Students will be expected to be able to perform algebraic and trigonometric calculations accurately and effectively, and to be comfortable with concepts and theorems from geometry. (Weakness with algebra and trigonometry is the number one source of difficulty in calculus; if you find yourself struggling with these topics, come speak to the course staff early in the semester!)

## Important resources

The following resources are available to help you succeed in Math 1231.

- Lecture and recitation
- Faculty and TA office hours (scheduled or by appointment)

- The calculus lab: <https://math.columbian.gwu.edu/calculus-lab-tutoring>
- Academic Commons (including peer tutoring): <https://academiccommons.gwu.edu/>

In addition, the University’s Mental Health Services offers 24/7 assistance and referral to address students’ personal, social, career, and study skills problems. Services for students include crisis and emergency mental health consultations confidential assessment, counseling services (individual and small group), and referrals. For additional information, see <https://counselingcenter.gwu.edu/> or call 202-994-5300.

## Lecture schedule

The course covers six chapters from the textbook over approximately 26 lectures. Chapter 1 (2 lectures) reviews functions, including basic function types, transformations, and trigonometry. Chapter 2 (4 lectures) introduces limits through limit laws, continuity, and the precise epsilon-delta definition. Chapter 3 (6 lectures) develops derivatives, covering the definition, differentiation rules, the chain rule, and implicit differentiation. Chapter 4 (5 lectures) applies derivatives to related rates, optimization problems, the Mean Value Theorem, and curve sketching. Chapter 5 (5 lectures) introduces integration through Riemann sums, establishes the Fundamental Theorem of Calculus, and develops basic integration techniques including substitution. Chapter 6 (4 lectures) explores applications of integration including areas between curves, volumes by slicing and cylindrical shells, and physical applications.

Exponential, logarithmic functions, and inverses are deferred to Calculus II.

Jan 13	(1.1, 1.2.1-1.2.6) Functions, Basic Classes	Mar 03	<b>Midterm 1 [Chapters 1-3]</b>
Jan 15	(1.2.8-1.2.9, 1.3) Piecewise, Trig	Mar 05	NO LECTURE
Jan 20	(2.1-2.2) Limits	Mar 9–14	Spring Break
Jan 22	(2.3) Limit Laws	Mar 17	(4.5-4.6) Graphs and Infinity
Jan 27	(2.4) Continuity	Mar 19	(4.7) Applied Optimization
Jan 29	(2.5) Limit Definition	Mar 24	(5.1) Approximating Areas
Feb 03	(3.1-3.2) Intro to Derivatives	Mar 26	(5.2) Definite Integral
Feb 04	<b>QUIZ 1 in Recitation</b>	Mar 31	(5.3) Fund. Thy of Calculus
Feb 05	(3.3) Differentiation Rules	Apr 01	<b>QUIZ 3 in Recitation</b>
Feb 10	(3.4) Rates of Change	Apr 02	(5.4) Integration Formulas
Feb 12	(3.5) Trig Derivatives	Apr 07	(5.5) Substitution
Feb 17	(3.6) Chain Rule	Apr 09	<b>Midterm 2 [Chapters 4-5]</b>
Feb 19	(3.8) Implicit Differentiation	Apr 14	(6.1) Areas between Curves
Feb 24	(4.1-4.2) Related Rates, Linear Approx	Apr 16	(6.2) Volumes by Slicing
Feb 25	<b>QUIZ 2 in Recitation</b>	Apr 21	(6.3) Cylindrical Shells
Feb 26	(4.3-4.4) Maxima/Minima, MVT	Apr 22	<b>QUIZ 4 in Recitation</b>
		Apr 23	(6.5) Physical Applications

## Communication

You can call me “Professor Sultan”, “Dr. Sultan”, or just “Harold”.

## Expected amount of work

There are just over 3 hours of class time each week. In addition, we expect a typical students to spend a minimum of 5 hours each week on independent work (primarily, homework assignments). Of course, you should spend as much time as you need to succeed in 1231, and this may be more than 5 hours per week.

## Course Structure

Attendance will not be monitored or enforced, but will be extremely helpful to progressing in your understanding of calculus. There will be online homework assignments due each Tuesday and Thursday, four quizzes, and two midterms and a comprehensive final exam.

## Grading

Your final grade will be calculated using whichever of the three options below is most advantageous to you. This system allows you to drop your lowest component among Quizzes, Midterm 1, and Midterm 2.

	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>
Homework	25%	25%	25%
Quizzes	25%	25%	0%
Midterm 1	25%	0%	25%
Midterm 2	0%	25%	25%
Final Exam	25%	25%	25%

Minimum scores for each letter grade are as follows: A, 94%; A-, 90%; B+, 87%; B, 84%; B-, 80%; C+, 77%; C, 74%; C-, 70%; D+, 67%; D, 64%; D-, 60%.

No extra credit will be available.

## WeBWorK Online Homework System

For each topic I will assign some homework through the WeBWorK online homework system. This system is free to students. It will give you an opportunity to practice basic skills you will need to succeed in the course. Homework will be weekly, due every Wednesday and covering material from the previous weeks of lectures.

You will have an unlimited number of attempts to get credit for each problem. If you find yourself struggling with a particular problem or type of problem, please discuss it with me, your TA, or one of the other academic resources suggested above. The purpose of this system is to give you an opportunity to practice; if you get the points without understanding, it's not fulfilling its purpose.

Each assignment will have a due date, generally a week after it is opened. However, you should attempt to complete these assignments well before the official due date, so that you are prepared to learn the more advanced material we are covering in class. You will have a grace period of one week after the due date during which you can submit your work for 90% credit. Consequently I will not give extensions except in extremely unusual circumstances.

## **Quizzes**

There will be four quizzes, given in person during Recitations. See the schedule for the dates. These will be short, timed assignments to make sure you can execute the most important computational skills in this course quickly and fluently. Jeremias will administer the quizzes in recitations. If, for an acceptable medical or family reason, you miss a quiz please contact Jeremias to see what options are available to you.

## **Midterm and Final**

There will be two midterms on Feb 19 and Apr 2, and a comprehensive final exam as scheduled by the registrar. I will distribute a practice test with solutions before each test so you will know what format to expect going in.

Midterm exams cannot be rescheduled. If, for an acceptable medical or family reason, you miss a midterm exam, your quizzes will replace the midterm (see Grading). Alternatively, come speak with me regarding another option which is to have final exam will replace the missed midterm exam.

I will update you when the registrar announces the final exam schedule. You will not be excused from the final if you schedule travel during finals week.

## **University Policies**

### **Academic Integrity Code**

Academic integrity is an essential part of the educational process, and all members of the GW community take these matters very seriously. As the instructor of record for this course, my role is to provide clear expectations and uphold them in all assessments. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and otherwise violate the Code of Academic Integrity. If you have any questions about whether particular academic practices or resources are permitted, you should ask me for clarification. If you are reported for an academic integrity violation, you should contact Conflict Education and Student Accountability (CESA) to learn more about your rights and options in the process. Consequences can range from failure of assignment to expulsion from the University and may include a transcript notation. For more information, refer to the CESA website at [students.gwu.edu/code-academic-integrity](http://students.gwu.edu/code-academic-integrity) or contact CESA by email [cesa@gwu.edu](mailto:cesa@gwu.edu) or phone 202-994-6757.

### **University policy on observance of religious holidays**

Students must notify faculty during the first week of the semester in which they are enrolled in the course, or as early as possible, but no later than three weeks prior to the absence, of their intention to be absent from class on their day(s) of religious observance. If the holiday falls within the first three weeks of class, the student must inform faculty in the first week of the semester. For details and policy, see [provost.gwu.edu/policies-procedures-and-guidelines](http://provost.gwu.edu/policies-procedures-and-guidelines).

### **Use of Electronic Course Materials and Class Recordings**

Students are encouraged to use electronic course materials, including recorded class sessions, for private personal use in connection with their academic program of study. Electronic course materials and recorded class sessions should not be shared or used for non-course related purposes unless express permission has been granted by the instructor. Students who impermissibly share any electronic course materials are subject to discipline under the Student Code of Conduct. Contact the instructor if you have questions regarding what constitutes permissible or impermissible use of electronic course materials and/or recorded class sessions. Contact Disability Support Services at [disabilitysupport.gwu.edu](http://disabilitysupport.gwu.edu) if you have questions or need assistance in accessing electronic course materials.

### **Academic Support**

#### **Academic Commons**

Academic Commons is the central location for academic support resources for GW students. To schedule a peer tutoring session for a variety of courses visit [go.gwu.edu/tutoring](http://go.gwu.edu/tutoring). Visit [academiccommons.gwu.edu](http://academiccommons.gwu.edu) for study skills tips, finding help with research, and connecting with other campus resources. For questions email [academiccommons@gwu.edu](mailto:academiccommons@gwu.edu).

#### **GW Writing Center**

GW Writing Center cultivates confident writers in the University community by facilitating collaborative, critical, and inclusive conversations at all stages of the writing process. Working alongside

peer mentors, writers develop strategies to write independently in academic and public settings. Appointments can be booked online at [gwu.mywconline](http://gwu.mywconline).

## **Support for students in and outside the classroom**

### **Disability Support Services (DSS) 202-994-8250**

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services at [disabilitysupport.gwu.edu](http://disabilitysupport.gwu.edu) to establish eligibility and to coordinate reasonable accommodations.

### **Student Health Center 202-994-5300, 24/7**

The Student Health Center (SHC) offers medical, counseling/psychological, and psychiatric services to GW students. More information about the SHC is available at [healthcenter.gwu.edu](http://healthcenter.gwu.edu). Students experiencing a medical or mental health emergency on campus should contact GW Emergency Services at 202-994-6111, or off campus at 911.

## **GW Campus Emergency Information**

GW Emergency Services: 202-994-6111

For situation-specific instructions, refer to GW's Emergency Procedures guide.

### **GW Alert**

GW Alert is an emergency notification system that sends alerts to the GW community. GW requests students, faculty, and staff maintain current contact information by logging on to [alert.gwu.edu](http://alert.gwu.edu). Alerts are sent via email, text, social media, and other means, including the Guardian app. The Guardian app is a safety app that allows you to communicate quickly with GW Emergency Services, 911, and other resources. Learn more at [safety.gwu.edu](http://safety.gwu.edu).

### **Protective Actions**

GW prescribes four protective actions that can be issued by university officials depending on the type of emergency. All GW community members are expected to follow directions according to the specified protective action. The protective actions are Shelter, Evacuate, Secure, and Lockdown (details below). Learn more at [safety.gwu.edu/gw-standard-emergency-statuses](http://safety.gwu.edu/gw-standard-emergency-statuses).

#### **Shelter**

- Protection from a specific hazard
- The hazard could be a tornado, earthquake, hazardous material spill, or other environmental emergency.
- Specific safety guidance will be shared on a case-by-case basis.

Action:

- Follow safety guidance for the hazard.

## **Evacuate**

- Need to move people from one location to another.
- Students and staff should be prepared to follow specific instructions given by first responders and University officials.

Action:

- Evacuate to a designated location.
- Leave belongings behind.
- Follow additional instructions from first responders.

## **Secure**

- Threat or hazard outside of buildings or around campus.
- Increased security, secured building perimeter, increased situational awareness, and restricted access to entry doors.

Action:

- Go inside and stay inside.
- Activities inside may continue.

## **Lockdown**

- Threat or hazard with the potential to impact individuals inside buildings.
- Room-based protocol that requires locking interior doors, turning off lights, and staying out of sight of corridor window.

Action:

- Locks, lights, out of sight
- Consider Run, Hide, Fight
- Classroom emergency lockdown buttons All classrooms have been equipped with classroom emergency lockdown buttons. If the button is pushed, GWorld Card access to the room will be disabled, and GW Dispatch will be alerted. The door must be manually closed if it is not closed when the button is pushed. Anyone in the classroom will be able to exit, but no one will be able to get in.