MAT 161 Calculus 1

Lia Vas

E-mail: lvas@sju.edu
Office: Barbelin Hall 228
Website: http://liavas.net (class material, review sheets, and formula sheets)

Class times, Fall 2025: MW 3:20-4:35 F 3:20-4:10. **Class meeting location, Fall 2025:** Mon and Wed in MV 207, Fri in BL 221 (HH campus)

Canvas: The solutions of any graded material (assignments and exams) will be posted on Canvas and, also, emailed to you.

Office Hour, Fall 2025 are by appointment: email me and we will find a time for us to meet. I will be glad to answer all of your questions about the course material, go over some problems together with you, check your assignment work, review together for an exam, or discuss any course content you may have questions about.

Topics covered:

1. Limits, continuity
2. Infinite limits, limits at infinity, asymptotes
3. The derivative, rates of change
4. Finding and using derivative
5. Higher derivatives. Differentiability

(Exam 1)

6. Product, quotient and chain rules
7. Derivatives of exponential, logarithmic and trigonometric functions
8. Linear approximation
9. Implicit differentiation
10. L'Hopital's rule
11. Related rates

(Exam 2)

12. Increasing and decreasing functions
13. Second derivative and concavity
14. Relative extrema. First and second derivative tests
15. Graphical analysis
16. Absolute extrema and optimization

(Exam 3)
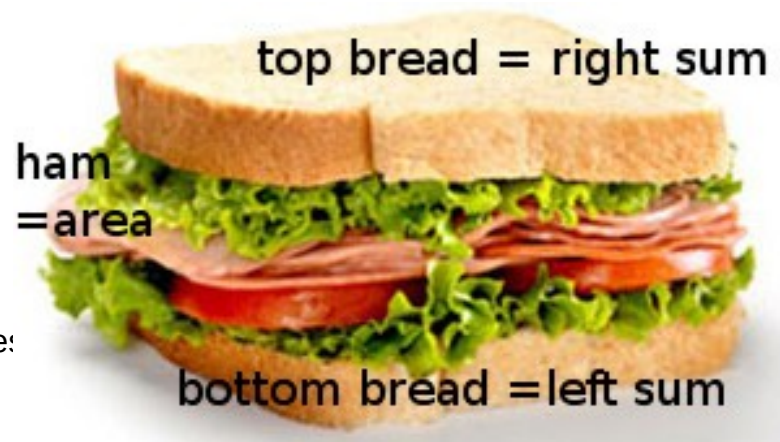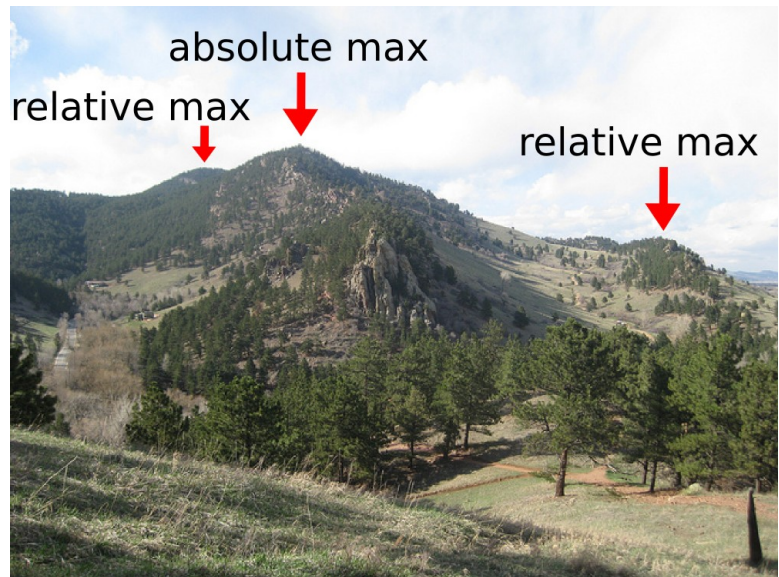
17. Indefinite integral. Substitution
18. Integrals of exponential and trigonometric functions. Integrals producing logarithms
19. Left and right sums. Definite integral
20. The Fundamental Theorem of Calculus
21. Areas between curves

(Final Exam)

Text: <u>No t</u>extbook required.
The class material, including practice problems, is on my website liavas.net. The course topics match chapters 2 to 5 (without 3.11, 4.8, and 4.9) of *Calculus* by James Stewart, published by Brooks/Cole. The same book covers topics of Calculus 2 and 3 courses.

Technology: All students are required to have a graphing calculator. Instructions will be given for TI83(+) or TI-84 calculators. If you do not have a graphing calculator, you can borrow one from the Math Department for a semester.

Tentative Exam Schedule:

Exam 1. During week 4 (Sept 17)	Exam 2. During week 7 (Oct 8)
Exam 3. During week 11 (Nov 5)	Final Exam. During the finals week

Grading:

Exams 1, 2 and 3	20% each
Final Exam	22%
Homework Assignments	18%
TOTAL	**100%**

Grades are computed according to the following system:

letter grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
number grade	93 to 100	90 to 92	87 to 89	83 to 86	80 to 82	77 to 79	73 to 76	70 to 72	67 to 69	60 to 66	0 to 59

Relevant Course Elements.

<u>**Number of credits**</u>: 4

Prerequisites: MAT 120, placement or the permission of instructor.

Attendance: It is imperative that students attend all classes. Students are responsible for all material covered in class, even if attendance is not checked or assignments collected. This is a rigorous course. You should plan to spend a minimum of twice the number of class hours on reading, homework assignments, and practice problems. It is your responsibility to come to class prepared to ask questions on any covered concept.

Exams: There will be **3 semester exams and a cumulative final exam**. No makeup exam will be given unless the excuse for missing the scheduled exam is acceptable to the instructor. Any makeup exam must be taken **before** the next regularly scheduled exam. **No exam grade will be dropped.**

Assignments: There will be **4 assignments** during the semester. There will be **no makeup** assignments. Assignments turned in after their due date will receive an automatic reduction in grade. **No assignment grade will be dropped.**

Course description: Limits; slopes, rates of change and the derivative; techniques of differentiation; implicit differentiation; derivatives of transcendental functions; related rates; linear approximation; L'Hoptial's Rule; the Mean Value Theorem; applications of differentiation (including curve sketching and optimization); introduction to integration; the Fundamental Theorem of Calculus.

Course Objectives.
- Students will obtain a well rounded introduction to the area of limits, differentiation and basic integration techniques.
- Students will develop basic knowledge of calculus problem formulation, problem solving and modeling techniques required for successful application of mathematics.
- Students will competently use the appropriate technology to model data, implement mathematical algorithms and solve mathematical problems.
- Students will cultivate the analytical skills required for the efficient use and understanding of mathematics.

General Education learning outcomes.
- Students will demonstrate knowledge of the analytical methods used within a specific mathematical field, and distinguish between effective and faulty reasoning.
- Students will formulate problems, obtain their solutions, and be familiar with modeling techniques required for successful application of mathematics to a variety of fields.

Course specific learning outcomes.
- Students will develop an understanding of differentiation, optimization, and integration and their uses.
- Students will be able to use calculus to solve problems from other disciplines.
- Students will be able to use appropriate technology to solve calculus problems.

Assessment methods: The learning outcomes will be assessed by students' performance on a selected problem of a semester exam.

Academic Integrity Statement: Saint Joseph's University encourages the free and open pursuit of knowledge; we consider this to be a fundamental principle and strength of a democratic people. To this end, SJU expects its students, its faculty, its administrators, and its staff to uphold the highest standards of academic integrity. The University expects all members of the University community to both honor and protect one another's individual and collective rights.

Students with Disabilities Statement: Reasonable academic accommodations may be provided to students who submit appropriate documentation of their disability. If students have need of assistance or questions with this issue, they are encouraged to contact the Office of Student Disability Services (SDS) at sds@sju.edu or by phone at 610.660.1774. The Office of SDS also provides an appeal/grievance procedure for complaints regarding requested or offered reasonable accommodations. More information can be found at: www.sju.edu/sds.

Health and Wellness Statement: Saint Joseph's University recognizes that physical and mental health strongly impact one's ability to do well in school and in life. As a result, there are many helpful campus resources designed to help students to care for their physical, mental, and spiritual health. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, mental health, alcohol or other drugs, identities, finances, etc. All of us benefit from support during times of struggle and challenges. If you are experiencing concerns, seeking assistance sooner rather than later is a courageous thing to do for yourself and those who care about you. The resources at https://sites.sju.edu/counseling/ can help you to cope with stress and to achieve your academic and personal goals.

Statement on AI use: The assignments in this course should be completed without any use of artificial intelligence platforms. Note that students will not have access to such platforms on in-class exams.