# MAT 155 Fundamentals of Calculus Instructor: Lia Vas, Ph.D.

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Class format in Fall 2023: The classes will be held on the University City campus.

Class times and place in Fall 2023: Tue and Th 2:00 pm –3:15 pm in STC 147.

**Office hours in Fall 2023**: Tue and Th 3:15 pm or at other times 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, asymptotes
- 2. The derivative, rates of change. Finding and using derivative
- 3. Higher derivatives. Differentiability

(Exam 1)

- 4. Product, quotient and chain rules
- 5. Derivatives of exponential, logarithmic and trigonometric functions
- 6. Implicit differentiation
- 7. Related rates

(Exam 2)

- 8. Increasing and decreasing functions
- 9. Second derivative and concavity
- 10. Relative extrema. First and second derivative tests. Graphical analysis
- 11. Absolute extrema and optimization

(Exam 3)

- 12. Indefinite integral. Substitution
- 13. Left and right sums. Definite integral

14. The Fundamental Theorem of Calculus. Areas between curves (Final Exam)





**Canvas:** You should be able to access the course page on Canvas. After the hand-in assignments and exams are graded, their solutions will be emailed to you and posted on Canvas.

**Mobius:** An online learning platform called Mobius is used instead of a texbook for this course. On Mobius, the course material is presented in a gradual way and there are step-by-step examples and practice problems. A link to Mobius is in one of the modules at the course home page on Canvas.

Instead of a textbook: In addition to Mobius, there are handouts on my website liavas.net

**Technology**: All students are required to have a graphing calculator. Instructions will be given for TI83(+) or TI-84 calculators.

## Tentative Exam Schedule:

Exam 1. During week 4 (Sept 21) Exam 3. During week 11 (Nov 9)

Exam 2. During week 7 (Oct 10) Final Exam: During the finals week

#### Grading:

Exams 1, 2 and 3	17% each
Final Exam	24%
Homework (hand-in) Assignments	15%
Mobius Assignments	10%
TOTAL	100%

Grades are computed according to the following system:

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

# **Relevant Course Elements.**

## Number of credits: 3

**Prerequisites:** MAT 120 or the permission of instructor.

<u>Attendance</u>: 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 going over the lectures, understand concepts, and doing the assignments and practice problems. It is your responsibility to come to class prepared to ask questions on any covered concept.

<u>Course Objectives.</u> By passing all exams and projects with at least 60% accuracy, the student will be able to:

- obtain a well-rounded introduction to the fundamentals of calculus;
- develop basic knowledge of calculus problem formulation, problem solving and modeling techniques required for successful application of calculus in any discipline;
- develop reasoning and problem-solving skills;
- cultivate the analytical skills required for the efficient use and understanding of mathematics.

#### Learning outcomes: Students will

- know the basic concepts of differential and integral calculus.
- demonstrate proficiency in differentiation and integration techniques.

- be able to model data using the language and techniques of calculus.
- be able to understand and solve multidisciplinary application problems using calculus.
- know how to use appropriate technology to solve problems applying calculus techniques.

**<u>Exams.</u>** 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.** 

<u>Hand-in Assignments.</u> There will be **four hand-in assignments** during the semester, one before each exam. The purpose of these assignments is to prepare you for the coming exams. 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.

<u>Mobius Assignments.</u> There will be 12 Mobius assignments during the semester and two lowest Mobius assignment grades will be dropped. The purpose of these assignments is to ensure you are on track with the material and to prepare you for the hand-in assignments and exams. There will be no makeup Mobius assignments.

**<u>Response time:</u>** The assignments and exams are typically graded in three days after they are turned in. Special circumstances like snow days, school closing or holidays, may occasionally delay the response time. Barring special circumstances, students' emails are usually responded to within one working day.

<u>Academic Integrity Statement</u>: 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.

<u>Students with Disabilities Statement:</u> 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 <u>sds@sju.edu</u> 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.

<u>Health and Wellness Statement</u>: 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 <u>https://sites.sju.edu/counseling/</u> can help you to cope with stress and to achieve your academic and personal goals.