

# Calculus 2

Instructor: Lia Vas, Ph.D.

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Instructor's Website (with class handouts, review sheets, and class recordings): <http://liavas.net>

In addition, you should be able to access the course page on Canvas. I will be posting the solutions of any graded material (assignments, projects and exams) on Canvas.

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

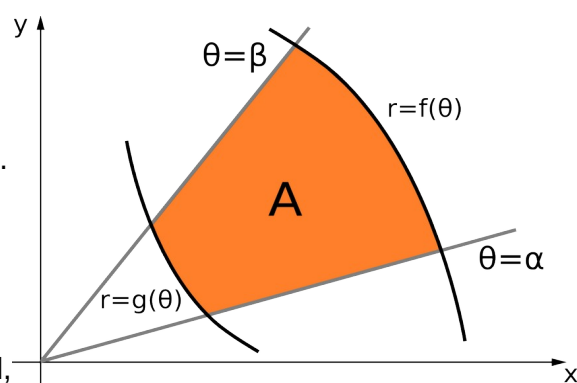
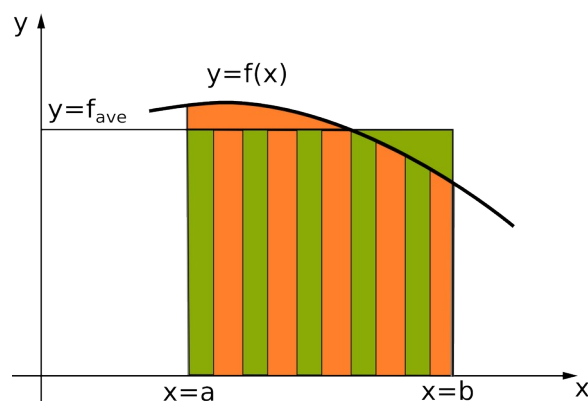
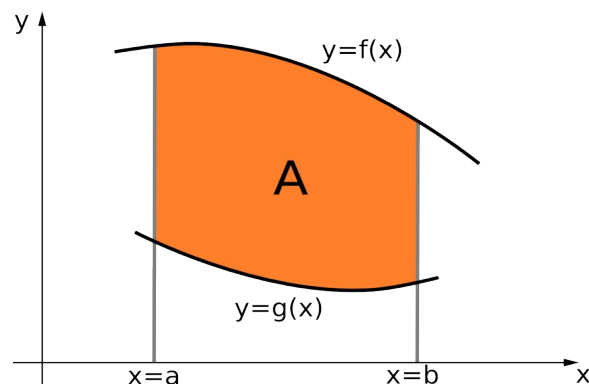
**Class times and place in Fall 2023:** Tue and Th 12:30–1:45, Fri 11:15–12:05 in STC 147.

**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, and discuss course content you may have questions about.

## Topics covered:

1. Review of Differentiation, Integration and Substitution. Exponential and Logarithmic Functions.
2. Definite Integrals. Left and Right Sum. The Fundamental Theorem of Calculus.
3. Areas between Curves.
4. Volumes (cross-sections and shells).
5. Applications of Integration. Work. Average Value of a Function
6. Differentiation and Integration involving Trigonometric and Inverse Trigonometric Functions.
7. L'Hopital's Rule  
(Exam 1)
8. Improper Integrals
9. Techniques of Integration: Integration by Parts, Partial Fractions, Trigonometric Integrals.
10. Approximate Integration: Trapezoidal and Simpson's Sum
11. Arc Length and Area of a Surface of Revolution  
(Exam 2)
12. Differential Equations. Separable Equations. Euler's Method
13. Autonomous Differential Equations and Population Dynamics
14. Applications. Modeling with Differential Equations.
15. Linear Equations
16. Parametric Curves: derivatives, area, arc length, surface area.  
(Exam 3)
17. Polar Coordinates. Areas and Lengths in Polar Coordinates
18. Taylor Polynomials  
(Final Exam)

**Text:** No textbook required. Handouts with course material, practice problems, and exam reviews are available on my website.



### Tentative Exam Schedule, Fall 2023:

Exam 1. During week 5 (Sept 28)    Exam 2. During week 9 (Oct 26)  
Exam 3. During week 12 (Nov 16)    Final Exam. During week 15 (the finals week)

### Grading:

Exams 1, 2 and 3	18% each
Final Exam	24%
Homework Assignments	11%
Projects	11%
<b>TOTAL</b>	<b>100%</b>

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.

**Number of credits:** 4

**Prerequisites:** MAT 155 or MAT 161 or permission of instructor.

**Attendance:** The class lectures will be delivered at the location and the times listed above. Recordings of the lectures are available on my website for students who miss some classes. To stay on track, it is highly recommended that students attend the classes and use the recordings just for reference.

Students are responsible for all material covered in class, even if attendance is not checked or assignments collected.

**Technology:** All students are required to have a graphing calculator. Detailed instructions will be available for TI83(+) and TI-84 calculators.

**Exams.** There will be **three 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 and projects.** There will be **four assignments and two Matlab projects** during the semester (students will be able to install Matlab on their home computers or to use it from a web browser). There will be no makeup assignments or projects. Assignments turned in after their due date will receive an automatic reduction in grade. **No assignment or project grade will be dropped.**

### Course Objectives.

- Obtain a well rounded introduction to the area of integration techniques, applications of integrals, differential equations, parametric curves and polar coordinates.
- Deepen students' knowledge of problem formulation, problem solving and modeling techniques required for successful application of mathematics obtained in previous calculus courses.
- Competently use appropriate technology to model data, implement mathematical algorithms and solve mathematical problems.
- Cultivate the analytical skills required for the efficient use and understanding of mathematics.

**Learning outcomes:** Students will:

- demonstrate proficiency in integration techniques,
- be able to use functions in parametric form and in polar coordinates,

- model and solve problems using the first order differential equations,
- demonstrate the use of calculus in problem solving,
- demonstrate proficiency in using mathematical software,
- know how to use appropriate technology to solve problems applying calculus techniques.

**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](mailto: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](http://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.