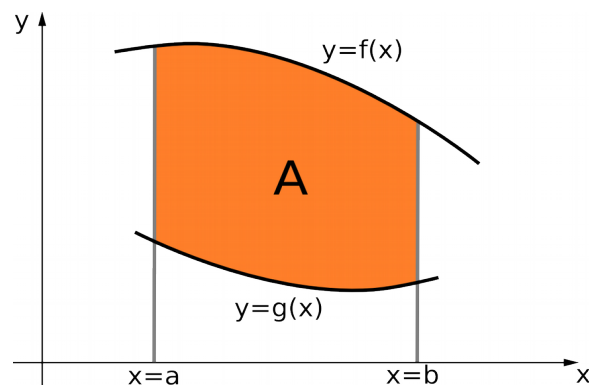


MA 221 Calculus 2

Instructor: Lia Vas, Ph.D.

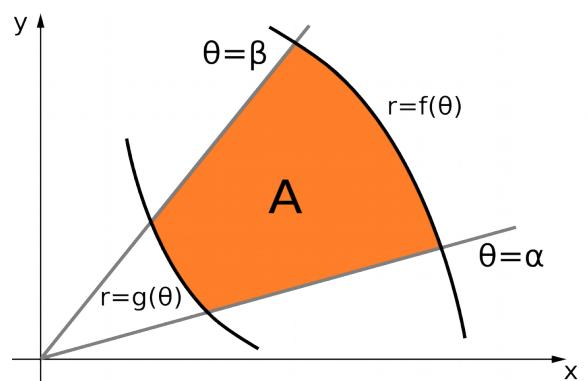
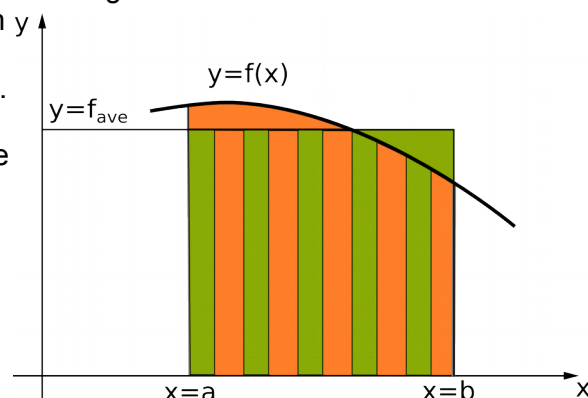
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Office Hours: Monday 3-4, Thursday 4-5, Friday 2-4 (no appointment necessary). Feel free to make an appointment if you cannot come to my regular office hours.

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 and practice problems will be distributed for each teaching unit. Also Review Sheets will be distributed before every exam. The course topics match chapters 6, 8 – 11 (without 8.3, 8.6, 10.5, 10.7, 11.6, 11.7), and sections 7.5 and 7.7 of *Calculus* by James Stewart (published by Brooks/Cole) which also covers topics of Calculus 1 and 3 courses.

Tentative Exam Schedule:

- Exam 1. During week 5 (09/28) Exam 2. During week 9 (10/26)
 Exam 3. During week 12 (11/16) Final Exam. During the finals week

Grading:

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

Grades are computed according to the following system:

letter grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
number grade	97 to 100	93 to 96	90 to 92	87 to 89	83 to 86	80 to 82	77 to 79	73 to 76	70 to 72	67 to 69	63 to 66	60 to 62	0 to 59

Relevant Course Elements.

1. **Prerequisites:** MA122 or MA110 or permission of instructor.
2. **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.
3. **Technology:** All students are required to have a graphing calculator. Detailed instructions will be available for TI83(+) or TI-84 calculators.

4. 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 the 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.

5. Learning outcomes: Students will:

- be able to demonstrate the 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,
- be able to demonstrate the use of calculus in problem solving,
- demonstrate a proficiency in using mathematical software,
- know how to use appropriate technology to solve problems applying calculus techniques.

6. Assessment

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. 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.**

7. General Education Skills and their Assessment

The course satisfies two General Education Skills: (1) Reasoning and Problem Solving, (2) Technology.

Reasoning and Problem Solving

Relevant Learning Outcomes. Students will demonstrate a logical approach to the solution of a problem. Specifically, students will be able to understand and solve multidisciplinary application problems using calculus.

Learning Activities. Problem solving in class. Includes (1) demonstration by instructor, practice by students, class discussion and developing problem solving skills, demonstration and practice in mathematical modeling; (2) Problem solving on assignments, projects, and exams. Emphasis on student learning. Students directly demonstrate acquired problem solving skills and success in applying problem solving in mathematics to problems in other disciplines.

Means of Assessment and Evaluation. Student's grade on three in-class exams and the comprehensive final exam will be used for assessment of the skill. The following grading scheme will be used.

Exceeded Expectations:	97% to 100%
Met Expectations:	73% to 96%
Approaching Expectations:	70% to 72%
Did Not Meet Expectations:	69% and below

Technology

Relevant Learning Outcomes. Students will demonstrate the ability to use advanced technology for professional activities. Specifically, (1) Students will know how to use appropriate technology to solve problems applying calculus techniques; (2) Students will demonstrate a proficiency in using mathematical software.

Learning Activities. Technology demonstration and practice. (1) General introduction to computer classroom, learning management system and specific computer technology. (2) Solving problems using mathematical software and graphing calculators.

Means of Assessment and Evaluation. Student's grade on two Matlab semester projects will be used for assessment of proficiency with mathematical software and the following scheme will be used. Selected problems on semester exams and/or the final exam will be used for assessment of proficiency using graphing calculator and the same scoring scheme will be used.

Exceeded Expectations:	97% to 100%
Met Expectations:	73% to 96%
Approaching Expectations:	70% to 72%
Did Not Meet Expectations:	69% and below

8. **Academic integrity:** Academic integrity is at the center of the educational experience at USciences. Students are therefore expected to uphold the highest standards of academic integrity and not engage in or tolerate academic dishonesty. Academic dishonesty includes, but is not limited to, fabrication, cheating or plagiarism. Any violation of academic integrity will be investigated and, where warranted, the student will receive appropriate sanctions through the University's Student Conduct Process. Please familiarize yourself with the current USciences Student Handbook. Adherence to the Student Conduct Policy and Academic Integrity Policy will help to ensure that your learning and living experiences are founded on integrity.

9. **Americans with Disabilities Act (ADA) Compliance Statement:** USciences supports the educational endeavors of all students, including students with disabilities. ADA defines a disability as a mental or physical impairment that substantially limits one or more major life activities. If you believe that you have a disability that may impact your ability to fulfill your course or degree requirements, and you would like more information on applying for an accommodation under ADA, please contact the Administrator of Student Accommodations at 215-596-8758.