Math 1952 – Calculus II Section 7

Lecture Time: 10:00am – 11:50am (MW) Location: Boettcher Center Auditorium 102
Recitation Time: 11:00am – 11:50am (F) Location: Sturm Hall 187

Instructor: Mei Yin mei.yin@du.edu
  Office and Office Hours: Zoom, 10:30am – 12:00pm (TR), or by appointment

TA: August Sangalli gus.sangalli@du.edu
  Office and Office Hours: Math Center, 4:00pm – 6:00pm (M), CMK 305, 12:00pm – 1:00pm (R)

COURSE DESCRIPTION

Calculus, which is covered at DU with the courses MATH 1951, 1952, 1953 and 2080, is the study of infinitesimal change. Whereas MATH 1951 is focused on the derivative, MATH 1952 is focused on integrals. Both of these concepts are defined in terms of a limit, which is a central idea that underlies all of Calculus. It turns out that these two special limits, the integral and the derivative, are closely related, and in particular the integral is tied to the idea of an antiderivative. This will force us to learn to 'undo' the derivative rules which we learned in 1951. Integrals have several important applications. The most fundamental is that an integral gives the area under the graph of a positive function on an interval. Beyond measuring area under the curve, we can use the integrals to compute many other important quantities such as the volume or surface areas of an object, the average value of a continuous function, the amount of work done by a force (as in physics) or the probability of a certain random event.

LEARNING OBJECTIVES

By the end of the course, you should be able to:

· Be able to approximate the area under a curve using a Riemann sum

or other techniques (Trapezoid Rule, Simpson's Rule). For certain functions, be able to determine whether your estimate is an over (or under) estimate.

· Give the definition of a Riemann integral as a limit, identify a limit of Riemann sums as a definite integral, and compute a Riemann integral by the definition.

· Find the indefinite or definite integral of a basic function via antiderivatives.

· Find the exact area under a curve or between curves, by computing the definite integral of a function on an interval.

· Apply the fundamental techniques of integration in order to find the indefinite integral of more complicated functions: substitution, integration by parts, trigonometric substitution.

· Be able to compute volumes of solids generated by rotating functions using integration.

· Find the average value of a continuous function over an interval via integration.

· Compute the surface areas of basic objects by integration.

· Be able to apply the concept of integration to problems in physics, and economics.

REQUIRED MATERIALS

Textbook – The textbook for this course is OpenStax Calculus: Volume II.

Calculator – Students may use a non-graphing, non-programmable calculator on quizzes or exams. Graphing calculators such as the TI-8x series will not be permitted.

GRADES

Your grades will be a weighted average of the following components.

Component	Points	Percentage
MathGPT.ai Homework	90	18%
Quizzes	60	12%
Midterm 1	100	20%
Midterm 2	100	20%
Final Exam / Presentation	150	30%
Total	**500**	**100%**

Note that the final exam / presentation will be comprehensive (covering the entire quarter).

MathGPT.ai Homework – There will be weekly assignments on the online homework system through MathGPT.ai. By and large these will be sets of routine problems for you to practice with. You should work these on paper and enter the answers into the site. The system allows for you to get instant feedback as you practice. With minor exceptions, MathGPT.ai homework will be due on Tuesdays. The two lowest MathGPT.ai section scores will be dropped.

Quizzes – There will be a quiz every week on Fridays, except during weeks when there is a midterm. Quiz problems will be based on lecture and the

assigned homework. Each quiz will count for 10 points; the lowest quiz score will be dropped.
Midterms – There will be two in-class 50 minute midterm exams.

- **Midterm 1 – Friday, January 30.**

- **Midterm 2 – Friday, February 27.**

Final Exam / Presentation – There will be a cumulative final exam / presentation on **Friday, March 20, 12-1:50pm.**

Grading Scale – Point totals in the following ranges will correspond to the following grades. Any modifications to this (which would be minor) will be to the benefit of the student.

Point Range	**Percentage**	**Grade**
465-500	93-100%	A
450-464	90-92.9%	A-
435-449	87-89.9%	B+
415-434	83-86.9%	B
400-414	80-82.9%	B-
385-399	77-79.9%	C+
365-384	73-76.9%	C

350-364	70-72.9%	C-
335-349	67-69.9%	D+
315-334	63-66.9%	D
300-314	60-62.9%	D-
0-299	0-59.9%	F

TENTATIVE SCHEDULE WEEK BY WEEK

Week	Sections Covered
Jan 5 – Jan 9	1.1 – Approximating areas 1.2 – The definite integral
Jan 12 – Jan 16	1.3 – The fundamental theorem of calculus 1.4 – Integration formulas and the net change theorem
Jan 21 – Jan 23	1.5 – Substitution 1.6 – Integrals involving exponential and logarithmic functions
Jan 26 – Jan 30	1.7 – Integrals resulting in inverse trigonometric functions **MIDTERM 1**

Feb 2 – Feb 6	2.1 – Areas between curves 2.2 – Determining volumes by slicing
Feb 9 – Feb 13	2.3 – Volumes of revolution (cylindrical shells) 2.4 – Arc length of a curve and surface area
Feb 16 – Feb 20	2.5 – Physical applications 3.1 – Integration by parts
Feb 23 – Feb 27	3.2 – Trigonometric integral 3.3 – Trigonometric substitution **MIDTERM 2**
Mar 2 – Mar 6	3.4 – Partial fractions 3.6 – Numerical integration
Mar 9 – Mar 13	3.7 – Improper integrals Review
Mar 16	Review
Mar 20	**FINAL EXAM / PRESENTATION**

OFFICE HOURS/MATH CENTER

Students are encouraged to come to office hours or go to the Math Center. A

great deal of learning mathematics comes outside of the classroom and your professor and TA enjoy having students come to office hours to talk about the material.

The Math Center https://science.du.edu/math/math-center provides a place to study, to do homework, and to ask questions. Students are encouraged to work with other students in the same class. When students have questions, assistants at the Math Center will give them hints and will guide them to find the answer. Working in small groups and having discussions with other students is one of the most effective ways to learn mathematics.

STUDENTS WITH DISABILITIES

If you qualify for academic accommodations because of a disability or medical issue, please submit a faculty letter to me from AccessibleDU: Student Disability Services (SDS) in a timely manner so that your needs may be addressed. SDS determines accommodations based on documented disabilities/medical issues. SDS is located in Suite 22 on the lower level of Driscoll South, 303-871-3241. Information is also available online at https://studentaffairs.du.edu/disability-services-program.

INCLUSIVE LEARNING ENVIRONMENT

In this class, we will work together to develop a learning community that is inclusive and respectful. Our diversity may be reflected by differences in race, culture, age, religion, sexual orientation, socioeconomic background, and myriad other social identities and life experiences. The goal of inclusiveness, in a diverse community, encourages and appreciates expressions of different ideas, opinions, and beliefs, so that conversations and interactions that could potentially be divisive turn instead into opportunities for intellectual and personal enrichment.

A dedication to inclusiveness requires respecting what others say, their right to say it, and the thoughtful consideration of others' communication. Both speaking up and listening are valuable tools for furthering thoughtful, enlightening dialogue. Respecting one another's individual differences is critical in transforming a collection of diverse individuals into an inclusive, collaborative and excellent learning community. Our core commitment

shapes our core expectation for behavior inside and outside of the classroom.

HONOR CODE/ACADEMIC INTEGRITY

All work submitted in this course must be your own. You are encouraged to work together on homework, but make sure that working together does not turn into copying another student's answer. For consequences of violating the Academic Misconduct policy, refer to the University of Denver website on the Honor Code (https://studentaffairs.du.edu/student-rights-responsibilities/honor-code).

RELIGIOUS ACCOMMODATIONS

University policy grants students excused absences from class or other organized activities for observance of religious holy days, unless the accommodation would create an undue hardship. Faculty are asked to be responsive to requests when students contact them **in advance** to request such an excused absence. Students are responsible for completing assignments given during their absence, but should be given an opportunity to make up work missed because of religious observance. Once a student has registered for a class, the student is expected to examine the course syllabus for potential conflicts with holy days and to notify the instructor by the end of the first week of classes of any conflicts that may require an absence (including any required additional preparation/travel time). The student is also expected to remind the faculty member in advance of the missed class, and to make arrangements in advance (with the faculty member) to make up any missed work or in-class material within a reasonable amount of time.

CAREER & PROFESSIONAL DEVELOPMENT

As you go through this course, it is common for questions to arise about how you will use these concepts in a potential career. Feel free to ask faculty members about their career paths and research areas, and also know the University of Denver offers a number of resources to help you on your career development journey. Career & Professional Development can help you

explore your interests, develop your job and internship search skills, and connect you with individuals in the field of your choice. Learn more, schedule an appointment, and see upcoming events at du.edu/career.