Math 1338 - Calculus II (Fall 2022)

Instructor: Ross Parker (rhparker@smu.edu)
Course hours: Mon/Wed/Fri 12:00 - 12:50 pm
Location: Umphrey Lee Center 0244
Website: Canvas
Help Sessions: Mon/Wed/Thu 5:30-6:30 pm in Clements Hall 225 with TA Mason McCallum.
Office Hours: Tuesday 2-3 pm, Wed 3-4 pm, Thu 3-4 pm in Clements Hall 221

Course Description

This course is a continuation of MATH 1337 through differential and integral calculus, areas and volumes, techniques of integration, improper integrals, and infinite sequences and series, including Taylor series.

Learning goals

Students will be able to:

- Compute the value of improper integrals.
- Determine convergence of sequences and infinite series.
- Generate Taylor polynomials and find the interval of convergence for Taylor series.
- Find the integral of a function using techniques of integration including substitution, integration by parts, and trigonometric substitution.
- Calculate the area and arc lengths of functions in rectangular, parametric, or polar form.
- Determine the volumes and surface area of a solid of revolution.

Students will also develop the following supporting skills:

- Students will interpret and translate between multiple different representations of information, such as visual, numerical, symbolic, and/or verbal representations.
- Students will use equations and/or principles to solve for an unknown quantity.
- Students will evaluate whether an argument or conclusion is valid and/or reasonable.
- Students will articulate an argument for an issue that uses quantitative data in a meaningful way.

Nuts and Bolts

Class format: This course will be taught in three 50-minute sessions per week. In accordance with current university policy, classes will be taught in-person. I will incorporate class participation and in-class activities as much as possible. Although I like to think I'm entertaining, no one wants to hear anyone lecture for 50 minutes straight!

Please feel free to interrupt me at any time to ask me to repeat something, clarify a point, request I slow down, fix my handwriting, point out a mistake I have made, etc. I will post surveys a few times throughout the course and welcome your feedback and suggestions for improvement.

- Although I will not formally take attendance, I *strongly* recommend attending class. You will only be able to participate in class activities and ask questions if you attend class.
- I request that during class you refrain from using electronic devices for non course-related purposes. I know that I cannot compete with TikTok and Snapchat for your attention, but I like to think that I am engaging and entertaining, and I will do the best I can to make the time we have together as useful as possible.
- I will post my notes on Canvas (under the Files tab) after each class.
- All exams will be taken during regularly scheduled class time. If you have accommodations for extra time, please contact me to make the necessary arrangements. The final exam must be taken during the block of time scheduled by the university.
- All homework assignments will be submitted electronically via Canvas.
- Office hours will start the second week of class. Please come to office hours for any questions about the course material, the homework, etc. **Important: you do not have to make an appointment for office hours. Just show up!** I am always happy to procrastinate my own research to talk with students. If you would like to meet but cannot attend scheduled office hours, please contact me to schedule an alternative time.

Prerequisites: C- or higher in MATH 1337 (or an A in MATH 1309 and departmental approval).

Textbook: This course will be taught using the open source textbook *Calculus, Volume 3*, from the Openstax Project, which is available free online at https://openstax.org/details/calculus-volume-2. You can read the textbook online and download a PDF of the complete text book for free. Physical copies can be purchased for about $30.

Reading: Specific reading assignments will be given on the main Canvas page for the course. Reading assignments are designed to help you understand the course material.

Resources: Here are some resources to help you succeed in this class. In addition, class notes will be posted after each class on Canvas.

- Help sessions for Calculus II with Mason McCallum: Mon 5:30-6:30 pm, Wed 5:30-6:30 pm, Thu 5:30-6:30 pm in Clements Hall 225. Please take advantage of these for help with problem sets, course concepts, exam review, etc.
- Resources for Calculus II. These may cover different topics in different orders.
  - Paul's online math notes.
  - Videos from Trevor Bazett.
  - Math TV with Professor V.
  - Videos from Krista King.
  - Videos for calculus with Dr. Marchese.

Homework: There will be problem sets due every **Friday at 11:59 pm**, starting the second week of class. These will be posted at least one week in advance. Homework must be submitted electronically on Canvas. To ease in grading, **please submit your assignment as a single PDF file**. If you write your problems on paper, I recommend the CamScanner app to scan them to PDF.

Learning mathematics, like getting to Carnegie Hall, is all about practice, practice, practice. For all assigned problems, you must **show all of your work**. This means you should display the process used, not just state a final result. Your goal is to convince me you know how to do the problem, not just what the answer is.

You are encouraged to discuss assignments with other students, but you must write up your own solution independently. When you have collaborated with other students, please acknowledge this by adding a note such as "I discussed question X with person A and person B." If you use any electronic resources, please indicate that as well. Identical or clearly copied assignments will be treated as violations of the honor code.

Do not postpone the problem sets until the last minute, as some answers may not come to you immediately, but then become clear a day later. If you are stuck on a problem, seek help from office hours or discussing with other students. Finally if you are not able to complete a question, write a short note to describe what you tried and what you think may be important. Credit on assignments will come from a serious effort as much as anything else.

Homework grading: Each homework problem will be graded on a five-point holistic scale. Grading for exam problems will be similar.

- Excellent (5): Problem shows good effort and understanding and is essentially correct (except perhaps for typos or equivalent). All relevant work is shown.
- Good (4): Problem shows good effort. There are some mistakes but no significant gaps in understanding.
- Satisfactory (3): Problem shows good effort, but there is at least one significant gap in understanding.
- Fair (2): Either problem shows only moderate effort, or there are many significant gaps in understanding.
- Poor (1): Problem was submitted, but minimal effort is shown.
- No credit (0): Problem was not submitted.

Homework policy: Late assignments will in general not be accepted. If you turn in every assignment, your lowest homework grade will be dropped.

Midterm exams: There will be three midterm exams, which will be administered during regular class time.

- Wednesday, September 21
- Wednesday, October 19
- Wednesday, November 16

Please contact me if you have an accommodation for extra time to make the appropriate arrangements. The exams will not be cumulative, although you may need to use techniques which were tested on the first exam on the second exam. All students are expected to take exams as scheduled, except as noted below. If you must miss an exam for one of these reasons, or for serious illness or injury, please contact me as soon as possible.

Final exam: The final exam has been scheduled by the university for Tuesday, December 13 from 11:30 am to 2:30 pm. By university policy, the final exam must be taken during this block of time. The final exam is cumulative, although it will emphasize material taught since the third midterm.

Exam policy: The following policies will be in effect for the midterm and the final exams.

- You may use a calculator during the exam if you wish, although it is unlikely to be helpful.
- You may use a study sheet for each exam. You must make the study sheet yourself. Study sheets must be one side of a single standard 8.5x11 sheet of paper. You may only write on one side of the paper. You may write whatever you want on it. You will be asked to turn in your study sheet on Canvas along with the exam, i.e. staple it to the back of your exam.
- All answers must be fully justified. You must show all of your work. Remember that your goal is to communicate the result to me in a clear manner so that I can see you understand what you are doing. If I cannot see how you arrived at an answer, even if it is correct, you will receive minimal points. Within reason, arithmetic mistakes will result in only minor point deductions, as long as I can see where you made them.
- You may not use the textbook, class notes, or any other paper references during the exam.

Grades: The grade for this class is computed as follows:

Homework	20%
Midterm Exams	45% (15% each)
Final Exam	35%

If your final exam grade is higher than your lowest midterm exam grade, that midterm grade will be replaced with the final exam grade. Letter grades are determined using a standard grading scale.

Outline: We will cover (roughly) the following topics in this course, in this order.

1. Improper integrals (3.7)
2. Sequences and series (5.1, 5.2)
3. Divergence and integral tests (5.3)
4. Comparison tests (5.4)
5. Alternating series (5.5)
6. Ratio and root tests (5.6)
7. Power series (6.1, 6.2)
8. Taylor series (6.3, 6.3)
9. Review of integration by Substitution (1.5)
10. Integration by parts (3.1)
11. Trigonometric integrals and substitution (3.2, 3.3)
12. Partial fractions (3.4)

13. Volumes by slicing (2.2)
14. Volumes of revolution (2.3)
15. Arc length and surface area (2.4)
16. Parametric curves (7.1, 7.2)
17. Polar coordinates (7.3. 7.4)

Additional topics, such as elementary differential equations, may be covered (if time allows).
Communication: Email is the best way to reach me. During the week, I will try to respond within 24 hours. Email responses may be slower on the weekends, but I will try to reply by Sunday evening. For complex questions, I may ask you to talk with me during office hours.

Anonymous feedback: Anonymous feedback may be provided at any point using the Feedback Box on Canvas.

Diversity Statement

While mathematics, in its idealized form, is objective, the practice and teaching of mathematics is not immune from social issues of race, gender, disability, nationality, and socioeconomic status. Pop culture and the media have not made this any better, from Teen Talk Barbie telling us that "math class is tough" to mathematicians and scientists being portrayed in movies and television as "nerdy white males" such as Tony Stark. I will use the following four axioms by Federico Ardila-Mantilla (San Francisco State University) as a foundation for our time together.

- Axiom 1. Mathematical talent is distributed equally among different groups, irrespective of geographic, demographic, and economic boundaries.
- Axiom 2. Everyone can have joyful, meaningful, and empowering mathematical experiences.
- Axiom 3. Mathematics is a powerful, malleable tool that can be shaped and used differently by various communities to serve their needs.
- Axiom 4. Every student deserves to be treated with dignity and respect.

It is my intent that students from all diverse backgrounds and perspectives be well-served by this course. I am committed to a climate of mutual respect both inside and outside of the classroom. To that end,

- I want you to feel comfortable to ask any question you want, to ask me for clarification, or to ask me to slow down, both in class and in office hours. There are no bad questions!
- I want you to feel comfortable "making mistakes" when participating in class. There will be no judgment on my part. I make mistakes all the time. It is a natural part of the learning process.
- If you feel like your performance in the class is being impacted by your experiences outside of class, please do not hesitate to come and talk with me.
- If something was said in class (by me or anyone else) that made you feel uncomfortable, please talk to me about it. If you prefer to speak with someone outside of the course, the Diversity and Inclusion Officers are an excellent resource.

- If you have a name and/or set of pronouns that differ from those that appear in your official records, please let me know.
- If you have any learning differences that you believe will affect your performance in this class, please come talk to me about how best to accommodate these.
- Anonymous feedback may be provided at any point using the Feedback Box on Canvas.

Honor Code

The SMU Honor Code applies to all homework and exams in this course. Work submitted for evaluation must represent your own individual effort. Any giving or receiving of aid without my express consent on academic work submitted for evaluation shall constitute a breach of the SMU Honor Code.

I take honor code violations very seriously, and will report all violations to the SMU Honor Council. The minimum penalty for a violation is a grade of 0 on the assignment, and the maximum penalty is immediate failure of the course. These penalties are in addition to those imposed by the SMU Honor Council. Examples of honor code violations include:

- Copying homework solutions from any source: online, another student, or a tutor.
- Allowing another student to copy your homework for another student to copy.
- Submitting a Matlab assignment produced by another student as your own.
- Cheating on an exam.

See the SMU Honor Code website for more information.

Disability Accommodations

Students needing academic accommodations for a disability must first register with Disability Accommodations and Success Strategies (DASS). Students can call 214-768-1470 or visit http://www.smu.edu/Provost/ALEC/DASS to begin the process. Once registered, students should then schedule an appointment with the professor as early in the semester as possible, present a DASS Accommodation Letter, and make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

Religious Observance

Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence.

Excused Absences for University Extracurricular Activities

Students participating in an officially sanctioned, scheduled university extracurricular activity should be given the opportunity to make up class assignments or other graded assignments that were missed as a result of their participation. It is the responsibility of the student to make arrangements for make-up work with the instructor prior to any missed scheduled examinations or other missed assignments. (See current Catalog under heading of "Academic Records/Excused Absences.")

Medical Related Absences

To ensure academic continuity and avoid any course penalties, students should follow procedures described by their instructors in order to be provided with appropriate modifications to assignments, deadlines, and exams.