Syllabus: M408D (Fall 2021)

SEQUENCES, SERIES, AND MULTIVARIABLE CALCULUS

Instructor: Gustavo Cepparo **Office:** PMA 13.148 **Phone:** 232-6189
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Lectures/Hybrid format:
PMA 4.102 and Zoom M W F 8:00 - 9:00 am
Instructor's Office hours:
F 1:00 - 4:00 pm Zoom/PMA and by appointment

Discussion Meeting times by section number:

Section	Time	Location
54915	T Th 8:30-9:30	Zoom
54920	T Th 3:30-4:30	Zoom

REQUIRED TEXTS/MATERIALS
The required textbook for this course is:
Stewart, Calculus, 8th Edition (Early Transcendentals)
https://www.cengage.com/coursepages/UT_LTA1M408

There is also a fee of $30 per semester per course (up to maximum of $60 per semester) for the Quest system.

Prerequisite and degree relevance: A grade of C or better in M408C or the equivalent. (Note: The pace of M408C and M408D is brisk. For this reason, transfer students with one semester of Calculus at another institution are requested to consult with the Undergraduate Adviser for Mathematics to determine whether M408D or an alternative, M408L, is the appropriate second course.). M408D may not be counted by students with credit for Mathematics 408L or 308M. M408C and M408D (or the equivalent sequence M408K, M408L, M408M) are required for mathematics majors, and mathematics majors are required to make grades of C or better in these courses.

Certain sections of this course are reserved as advanced placement or honors sections; they are restricted to students who have scored well on the advanced placement AP/BC exam, or are honors students, or who have the approval of the Mathematics Advisor. Such sections and their restrictions are listed in the Course Schedule for each semester.

Course description: M408C and M408D is our standard first-year Calculus sequence. It is directed at engineering students and students in the natural and social sciences. The emphasis in this course is on problem solving, not on the presentation of theoretical considerations. While the course necessarily includes some discussion of theoretical notions, its primary objective is not the production of theorem-provers. M408D contains integration techniques, brief modeling with differential equations, parametric equations, a treatment of infinite series, partial derivatives, and multiple integrals.

ADVICE FOR SUCCESS: ***This course is not a self-paced course*.** Actively participate in the course by attending class or by watching the recorded Zoom lecture later during the day, asking questions in class and in discussion, doing the assigned homework problems (both Written homework and Quest homework), working on additional personal practice problems covering your weak topics, and utilizing office hours, the CALC Lab, Learning Labs and making study groups. Please do come to my Zoom office hours and also our TA's Zoom office hours if you have questions or concerns.

Required Time: You cannot learn abstract concepts in math by listening to someone talk about it. You learn mathematics by thinking about definitions, working on problems. And this takes ***time***. If you allow yourself plenty of time to think about the material, you will find it much more interesting and enjoyable. A reasonable amount of time (for any college class, but especially for math) is three hours outside of class for every hour in class. You have made up your schedule this semester to include your classes at certain times every week. You should now include on that schedule certain regular hours for study—three hours of study for each hour you are in class. If you do not do this, you will not do as well in school as you are capable of, and you will find it more frustrating than it should be.

How do people learn? In the last few years, there has been much research on learning. It is clear that real learning involves making connections between the new material and what you already know. The best way to do this is to quiz yourself on what you are learning. This enables you to identify the places where the new material seems to be inconsistent with what you already think, to explore this, and to reconcile it. That means that you should do exercises as if they are quizzes: making mistakes, correcting those mistakes, and recording what you changed about your understanding as you did this.

It is crucial that you do four things EVERY WEEK:

1. **Work through the material** by reading the textbook. As you do this, make notes of anything you need that help in understanding.
2. **Keep track of vocabulary and new definitions.** Sequences, Series and Multivariable Calculus has plenty of new vocabulary and definitions. Take time to think about the new vocabulary and definitions and practice using this new vocabulary as you explain concepts to yourself or your peers in a study groups.
3. **Work exercises**: homework exercises (or proofs) and similar exercises that have

answers or hints in the back of the textbook. Continue to make notes of anything you need help on and get that help at Calc Lab, Learning Labs, discussion session, study groups and office hours.

4. **Prepare written and Quest work (Homework)**, which includes exercises worked out by hand from the textbook and from Quest. Look for extra examples in Canvas (under Modules),

Students who struggle with this course are almost always trying to avoid making mistakes. Think of mistakes as your friends – they give you a shortcut to finding the parts of the material which you still need to connect to things you already understand. Students who are trying to avoid mistakes usually spend more time than needed reading/viewing the material, so they have less time for the most important part of learning: working on exercises, identifying difficulties/confusions, and asking questions and discussing what is confusing. Zoom lectures and discussion sessions are a vital part of the course.

Before you email me to ask a question about the rules and procedures of this course, please read through this syllabus to see if the answer is written here. I diligently tried to include here any information that you might ask; please utilize it.

HONOR CODE: The class is expected to uphold The University of Texas at Austin Honor Code. The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

Academic Integrity Policy: Students who violate University rules on academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on academic dishonesty will be strictly enforced. For further information, please visit the Student Conduct and Academic Integrity website at http://deanofstudents.utexas.edu/conduct (Links to an external site.).

Sharing of Course Materials is Prohibited: No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have my explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. I am well aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course.

Class Recordings: Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

STUDENT CONDUCT

Please join our Zoom/in-person class lectures on time and be prepared to actively participate. The class is expected to uphold The University of Texas at Austin Honor Code (Links to an external site.) in all settings, all modes of communication, and all interactions with each other (Zoom class meetings, all assignment submissions, all e-mail communications, all Ed Discussion communications, etc.).
The University Code of Conduct applies to online behavior as well as in-person or classroom behavior. You are expected to be professional and respectful when attending class on Zoom. The following are class policies for our meetings with Zoom. Please read carefully, these policies are effective immediately and apply for the remainder of the semester. All students are expected to adhere to the policies.

NOTE: Class meetings on Zoom (including video, audio, and chat text) will be recorded. Violations are subject to The University of Texas Student Code of Conduct and will be adjudicated accordingly.

General

Sign in with your full first name and last name as listed on the class roster: Do not use a nickname or other pseudonym when you log in. It makes it impossible to know who is in attendance. Using your full name quickly sorts students into their groups when needed. **Users who do not provide their full names will NOT be admitted to class.**

Exceptions: Since enrolling in class, some students have changed their names to better reflect their gender identity. If you currently use a different name than what is listed on the official roster, please send a private Canvas message so this can be noted on the roster and you can use your current name on Zoom.

Stay focused: Please stay engaged in lectures and discussion. Close any apps on your device that are not relevant and turn off notifications. Be present and avoid multi-tasking.

Have patience, grace, and mercy on yourself and one another.

Video

Turn on your video when possible: It is helpful to be able to see each other, just as in an in-person class. I prefer to see student reactions and engagement during Zoom discussions. If you choose to mute your video, then please use an appropriate photo in your Zoom profile. Having your face in the photo will help me to recognize and get to know students.

Exceptions: If you have limited internet bandwidth or no webcam, it is ok to not use video. If you're unable to find an environment without a lot of visual distractions, it is also ok to turn off your video.

Keep it clean: Don't share anything you wouldn't put up on the projector in class!

Audio

Mute your microphone when you are not talking: This helps eliminate background noise.

Use a headset when possible: If you own headphones with a microphone, please use them. This improves audio quality.

Be in a quiet place when possible: Find a quiet, distraction-free spot to log in. Turn off any music, videos, etc. in the background.

Chat

Stay on topic: Use the chat window for questions and comments that are relevant to class. The chat window is not a place for socializing or posting comments that distract from the course lecture, activities or discussion. If you fill it up with random comments, I will be unable to sort through the information quickly to address students' real questions/concerns about the course.

No disrespect: Just like in our in-person class, respectful behavior is expected. Consider Zoom a professional environment. Assume each other's good intention and take care of any impacts you cause. Accept that people's family members, housemates, or pets may be seen or heard in the background. Warn your family members and housemates when you are on a digital conference so that they can support your participation. It is welcome for children to be seen sitting in people's laps, coming to ask questions, etc. Have patience, grace, and mercy on yourself and one another. Since one of our new objectives is to build professional skills in remote interaction, there are new norms that we must practice in our digital conferencing environment. These norms allow you to fully participate and also be more efficient in your learning now and more productive later in your professional lives.

ATTENDANCE POLICY

You have the option to attend in person, via Zoom in real time or watch the Zoom recording later on. Email me in the event you become ill and stay home. In such a situation, you should watch the recorded Zoom lecture and download the real time lecture pdf notes. Contact your study group via email, go to Zoom office hours and use Ed Discussion and attend CalcLab.

SEMESTER EXAMS

There are four exams during the semester (see calendar below) and a final exam during finals week. Makeup exams or exam extensions are only offered for religious observance, severe illness, or COVID-19 impact. However, the lowest exam grade will be replaced by the final exam grade if the final exam grade is higher than the lowest exam grade. No notes or flashcards during exams. I do give partial credit on exams. However, I entertain no discussion of partial credit. If you miss an exam and have a valid excuse, then your score will be replaced by your score on the final examination. If you miss an exam without a valid excuse, your score will be a zero. If a student misses a semester exam, then he or she will need to meet individually with me (Zoom) to determine whether a medical withdrawal or an incomplete is appropriate.

FINAL EXAM DATE: TBA (see UT Direct)

The final exam will be a comprehensive exam with a 24-hour window. Open response (upload to Canvas) and Quest parts. You cannot miss this, so plan accordingly.

RESOURCES FOR STUDENTS: Some of our students have weak study skills. **SANGER LEARNING CENTER** in Jester Hall has a wide variety of material designed to help students through Calculus: tutors, drills, video-taped lectures, computer programs, counseling, math anxiety workshops, reviews of Algebra, Trigonometry, and Calculus. Utilize the Sanger Learning and Life Center!

CALC LAB: The Math Department **Calculus Lab**. This is a joint TA session for **all** calculus classes taught at UT, and will be staffed at all times by at least two TAs and 3 undergraduate Learning Assistants. *You can always get help at Calc Lab!*

GRADING: Your grade will be based on your performance on homework and exams following the grading scheme below. This course does not have extra credit. Homework will be due **every week**, and there will be five exams. To master the course material, you must stay caught up with the topics covered in lectures and with the related homework. This course will move fast and cover a lot of material! In addition, staying caught up will help you identify questions to ask during class, which will certainly help others as well. Copying another student's solution or that from another text is a violation of the honor code and fails to contribute to your personal mathematical development. Students must show all work to each solution. **No late homework will be accepted for any reason! No credit will be given for unsupported answers. This means that all work should be shown, neatly and logically, using correct notation.**

The specific grading scheme and exam information are as follows:

- Written-Homework, **due every week (Thursday) by 5:00 pm**: 18%
- Quest-Homework, **due every week (Saturday) by 5:00 pm**: 18%
- 2 mid-term Exams: 20% each
- Final Exam (Comprehensive): 24%

- Grades will be recorded in Canvas. ***Canvas is NOT used to determine your semester grade in this course.*** Canvas is only used as a means to store and share your grades. All of your individual grades will remain in Canvas as the score you originally earned on each of them. ***Your semester grade for the course is determined as detailed in this syllabus.*** Any discussion on homework grades must occur prior the final exam. Your final exam grade is final and non-negotiable. Thus, any discussions of your course grade must occur prior to the final exam administration.

Plus/minus grades will be assigned for the final grade as follows: A (100-92.6), A- (92.5-89.6), B+ (89.5-86.6), B (86.5-82.6), B- (82.5-79.6), C+ (79.5-76.6), C (76.5-72.6), C- (72.5-69.6), D+ (69.5-66.6), D (66.5-62.6), D- (62.5-59.6), F (59.5-0).

Written-homework:
All sections covered in one week are due the following week on Thursday **by 5:00 pm**.
For example during Week 1 we will go over Sections 5.5 and 7.1, so during Week 2 by Thursday you must complete Homework 1 (only Sections 5.5 and 7.1 see calendar below). Homework is due at 5:00 pm with a grace period till 11:00 pm (Thursdays). You must upload the homework to Canvas before 11:00 pm.

Quest-homework:
All sections covered in one week are due the following week on Saturday **by 5:00 pm**.
For example during Week 1 we will go over Sections 5.5 and 7.1, so during Week 2 by Saturday you must complete Homework 1 (below see calendar). The homework is due at 5:00 pm with a grace period till 11:00 pm (Saturday). You must complete the homework in Quest before 11:00 pm. Follow the instructions in Quest (https://quest.cns.utexas.edu) to set up an account.

Our grader will not grade any disorganized or difficult-to-read assignments. Your homework is your best piece of work. Make sure you have one pdf file in order to upload to Canvas. Copying another student's solution or that from another text is a violation of the honor code and fails to contribute to your personal mathematical development. Students must show all work to each solution. **No late Written-homework or Quest-homework will be accepted for any reason! You already have a grace period. No credit will be given for unsupported answers. This means that all work should be shown, neatly and logically, using correct notation.**

I will drop two "Quest" Homework grades.

> ***Format:*** *Write your name at the top of each page. The first page should state the class, section number, instructor's name, and book sections included in the homework assignment. Label each question clearly, specifying the section and exercise number (i.e. 14.1 #32). It should be organized, clean, and easy to read.*

CALENDAR

"Please note: schedule changes may occur during the semester. Any changes will be announced in class."

WEEK 1

In class ↓	***Homework*** ↓
Wed., Aug. 25 5.5 Substitution Rule	Section 5.5 Problems 12, 22, 30, 46, 48, 58, 67, 72, 78, 81, 86, 87
Fri., Aug. 27 7.1 Integration By Parts	Section 7.1 Problems 5, 8, 10, 14, 15, 18, 22, 26, 42, 52, 68, 71

WEEK 2

Mon., Aug. 30 7.2 Trigonometric Integrals	Section 7.2 Problems 2, 4, 7, 8, 12, 16, 19, 26, 29, 31, 39, 48, 49, 56, 67
Wed., Sep. 1 7.3 Trigonometric Substitution	Section 7.3 Problems 2, 5, 8, 9, 12, 14, 19, 21, 24, 27
Fri., Sep. 3 7.4 Integration of Rational Functions by Partial Fractions	Section 7.4 Problems 2, 4, 6, 7, 12, 18, 23, 28, 40

WEEK 3

Wed., Sept. 8 7.5 Strategy for Integration	Section 7.5 Problems 2, 3, 13, 15, 22, 25, 31
Fri., Sept. 10 7.8 Improper Integrals	Section 7.8 Problems 12, 15, 18, 20, 35, 49, 57, 58, 59

WEEK 4

Mon., Sept. 13 9.1 Modeling with Differential Equations	Section 9.1 Problems 2, 3, 4, 5, 9, 13, 14, 15
Wed., Sept. 15 9.2 Direction Fields and Euler Method	Section 9.2 Problems 3, 4, 5, 6, 10, 11, 14, 21, 27, 28
Fri., Sept. 17 9.3 Separable Equations	Section 9.3 Problems 6, 11, 14, 16, 20, 39, 43, 45, 48

WEEK 5

Mon., Sept. 20 9.4 Models for Population Growth	Section 9.4 Problems 1, 5, 6, 11, 13, 17, 18
Wed., Sept. 22 9.5 Linear Equation	Section 9.5 Problems 1, 2, 3, 4, 6, 7, 8, 10, 16, 17
Fri., Sept. 24 9.5 Linear Equations (continue)	Section 9.5 (continue) Problems 23, 24, 28, 31, 33, 34

WEEK 6

Mon., Sep. 27 11.1 Sequences	Section 11.1 Problems 15, 18, 51, 47, 72, 77
Wed., Sep. 29 11.2 Series	Section 11.2 Problems 14, 20, 27, 32, 48, 59
Fri., Oct. 1 **Review**	**Chapters 7 and 9**

WEEK 7

Mon., Oct. 4 **TEST 1**	**Chapters 7 and 9** **[1] Quest Portion (7 hour-window) 70%** **[2] Project Portion (Free Response) (24 hour-window) 30%**
Wed., Oct. 6 11.3 The Integral Test and Estimates of Sums	Section 11.3 1, 4, 8, 11, 14, 21, 28, 29, 32, 36, 38
Fri., Oct. 8 11.4 Comparison Test	Section 11.4 1, 2, 3, 4, 8, 10, 13, 20, 24, 29, 33, 37, 40

WEEK 8

Mon., Oct.11 11.5 Alternating Series	Section 11.5 3, 10, 14, 16, 20, 25, 27, 32, 35
Wed., Oct.13 11.6 Absolute Convergence and the Ratio and Root Tests	Section 11.6 4, 7, 13, 21, 22, 24, 26, 29, 51

Fri., Oct. 15 11.7 Strategy for Testing Series	Section 11.7 6, 7, 13, 16, 23, 24, 32, 35, 36, 37 Hint for 36: Comparison to p-series.

WEEK 9

Mon., Oct. 18 11.8 Power Series	Section 11.8 6, 12, 17, 24, 28, 30, 31, 35, 36
Wed., Oct. 20 11.9 Representations of Functions as Power Series	Section 11.9 8, 10, 12, 13, 16, 19, 25, 29, 34, 36
Fri., Oct. 22 11.10 Taylor and Maclaurin Series	Section 11.10 5, 8, 12, 23, 37, 55, 60, 62, 73, 79

WEEK 10

Mon., Oct. 25 11.11 Applications of Taylor Polynomials	Section 11.11 4, 6, 9, 14, 15, 20, 27, 30, 31
Wed., Oct. 27 11.11 Applications of Taylor Polynomials (continue)	Section 11.9 26, 33, 37 Section 11.10 26, 32, 33, 63, 75
Fri., Oct. 29 11.11 Applications and the Binomial Series	Section 11.10 31, 34, 51, 52, 53, 59

WEEK 11

Mon., Nov. 1 10.1 Curves Defined by Parametric Equations 10.2 Calculus with Parametric Equations	Section 10.1 2, 6, 8, 11, 14, 24, 26, 28, 35 Section 10.2 4, 6, 12, 16, 30, 38, 39, 41, 44, 69
Wed., Nov. 3 10.3 Polar Coordinates	Section 10.3 2, 4, 8, 11, 15, 17, 18, 22, 54, 55, 61
Fri., Nov. 5 **Review**	**Chapter 11**

WEEK 12

Mon., Nov. 8 **Test 2**	**Chapter 11** **[1] Quest Portion (7 hour-window) 70%** **[2] Project Portion (Free Response) (24 hour-window) 30%**
Wed., Nov. 10 10.4 Areas and Lengths in Polar Coordinates	Section 10.4 2, 5, 7, 17, 19, 24, 37, 45
Fri., Nov. 12 14.1 Functions of Several Variables	Section 14.1 2, 7, 10, 15, 19, 25, 32, 81

WEEK 13 (Suggested problems)

Mon., Nov. 15 14.2 Limits and Continuity	Section 14.2 5, 9, 11, 13, 16, 17, 18, 29, 30, 39
Wed., Nov. 17 14.3 Partial Derivatives	Section 14.3 3, 4, 7, 8, 10, 17, 23, 29, 36, 45, 73, 84
Fri., Nov. 19 14.5 The Chain Rule 14.4 Tangent Planes and Linear Approx.	Section 14.5 5, 22, 31, 33, 35, 38 Section 14.4 3, 7, 21, 27, 36, 38, 41, 43

WEEK 14 (Suggested problems)

Mon., Nov. 22 15.1 Double Integrals over Rectangles and Iterated Integrals	Section 15.1 3, 5, 6, 9, 19, 33, 35, 42

WEEK 15 (Suggested problems)

Mon., Nov. 29 15.2 Double Integrals over General Regions	Section 15.2 1, 2, 3, 4, 7, 11, 15, 17, 25, 29, 39
Wed., Dec. 1 15.9 Change of Variable in Multiple Integrals	Section 15.9 1, 2, 3, 7, 9, 15
Fri., Dec. 3 15.9 Change of Variable in Multiple Integrals and examples for Double Integrals in Polar Coordinates.	

WEEK 16

Mon., Dec. 6 (Last Class Day) 15.10 Change of Variable in Multiple Integrals (continue). Review for Final	**Final exam (Test 3)**: See UT Direct for final information. Two Parts: Open response upload to Canvas 30% (show all work portion) and a Quest portion 70%.

RELIGIOUS HOLIDAYS

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

DEADLINES FOR DROPPING A COURSE

If you drop a class on or before September 11 (12th class day), the class will not show up on your transcript. If you drop a class after that date, the course will show up on the transcript with a "Q" grade. After October 29 it is not possible to drop a course except for extenuating (usually non-academic) circumstances. See the Registrar's website (Links to an external site.) for full calendar information.

SERVICES AVAILABLE TO STUDENTS

The University of Texas provides appropriate academic accommodations for qualified students with disabilities. Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities (Links to an external site.), 471-6259.
Utilize the Sanger Learning and Life Center (Links to an external site.)!
Counseling and Mental Health Center (Links to an external site.), Student Services Bldg (SSB), 5th Floor, Hours: M-F 8 am-5 pm, 512-471-3515

Behavior Concerns Advice Line

BCAL: 512-232-5050
Link to information regarding emergency evacuation routes and emergency procedures can be found at: www.utexas.edu/emergency

CLASSROOM SAFETY AND COVID-19

To help preserve our in-person learning environment, the university recommends the following.

- Adhere to university mask guidance. Masks are strongly recommended, but optional, inside university buildings for vaccinated and unvaccinated individuals, except when alone in a private office or single-occupant cubicle.
- Vaccinations are widely available, free and not billed to health insurance. The vaccine will help protect against the transmission of the virus to others and reduce serious symptoms in those who are vaccinated.

- Proactive Community Testing remains an important part of the university's efforts to protect our community. Tests are fast and free.
- The university has determined that all students coming to campus for the fall semester must receive a viral COVID-19 test in their local community within 72 hours prior to arrival in Austin for move in. If they already reside in Austin, they must test within 72 hours of moving into the residence where they will reside for the academic semester. Finally, individuals who are already living in the residence in Austin where they will reside this academic semester should test within 72 hours (3 days) prior to the start of class on Aug. 25.
- We encourage the use of the Protect Texas App each day prior to coming to campus.
- If you develop COVID-19 symptoms or feel sick, stay home and contact the University Health Services' Nurse Advice Line at 512-475-6877. If you need to be absent from class, contact Student Emergency Services and they will notify your professors. In addition, to help understand what to do if you have been had close contact with someone who tested positive for COVID-19, see this University Health Services link.
- Behavior Concerns and COVID-19 Advice Line (BCCAL) remains available as the primary tool to address questions or concerns from the university community about COVID-19.
- Students who test positive should contact BCCAL or self-report (if tested off campus) to University Health Services.
- Visit Protect Texas Together for more information.