MATH 2550 Multivariable Calculus

Lecture G & J

Fall 2025

1. Course Information

Course Title: Intro. Multivariable Calculus

Lecture Meeting Times: Lecture 2550 G on MW 2:00 - 2:50pm in Kendeda 152, and Lecture 2550 J on MW 3:30 - 4:20pm in Paper Tricentennial 109

Studio	Time	Room	Teaching Assistant
G01	F 11:00-11:50 am	Skiles 156	Nwagwu, Chijindum
G02	F 11:00-11:50 am	Skiles 257	Seabold, Jasper
G03	F 11:00-11:50 am	Skiles 168	Dossani, Neha
G04	F 11:00-11:50 am	Skiles 154	Smith, Armani
G05	F 11:00-11:50 pm	Skiles 254	Zhou, Keru
J01	F 12:30-1:20 pm	Skiles 169	Cascone, Francesco
J02	F 12:30-1:20 pm	Skiles 171	Zhou, Keru
J03	F 12:30-1:20 pm	Skiles 256	Seabold, Jasper
J04	F 12:30-1:20 pm	Skiles 371	Smith, Armani
J05	F 12:30-1:20 pm	Skiles 170	Dossani, Neha

1.1 Course Content

Math 2550 is an introduction to multivariable calculus. Topics include:

- Vectors and the geometry of space, vector calculus, parametric curves and motion
- Functions of several variables, visualization and partial differentiation, gradients, linear approximation, tangent planes, differentials, optimization, Lagrange multipliers
- Double and triple integrals, applications
- Vector analysis including the theorems of Green, Gauss, and Stokes

1.2 Learning Outcomes

The primary goal of Math 2550 is to prepare students to succeed in upper level courses that require this course as a pre-requisite. Upon successful completion of the course, students will be able to:

- Describe three-dimensional vectors, surfaces, and multivariable functions geometrically.
- Analyze vector-valued functions using calculus to characterize motion and paths in two and three dimensions.
- Calculate and interpret derivatives of multivariable functions to describe and estimate how such functions change.
- Analyze and solve multivariable optimization problems.
- Construct and evaluate integrals of multivariable functions using Cartesian and other coordinate systems.
- Construct and evaluate integrals of scalar and vector functions over curves and surfaces using the theorems of Green, Gauss, and Stokes
- Apply these integrals and theorems to model physical quantities such as flux and circulation.
- Contextualize mathematical quantities involving multivariable functions to interpret their meaning within problems that arise in everyday life or to give a geometric interpretation of them.

2. Instructor and TA Contact Information

Instructor: Dr. Sal Barone
Instructor Office: Skiles 013
Instructor Email: sbarone@math.gatech.edu.
Instructor Office Hours: TBA
If none of these office hours are possible for you, let me know via email and we can arrange some other time to meet.

TA Contact Info:

Teaching Assistant	Section(s)	Email	Office Hours
Armani Smith	G04/J04	asmith815@gatech.edu	W 12:30-1:30 Skiles 230
Chijindum Nwagwu	G01	cnwagwu3@gatech.edu	F 3:30-4:00 Skiles 230
Francesco Cascone	J01	fcascone3@gatech.edu	F 11:30-12:30 Skiles 230
Jasper Seabold	G02/J03	jasper.seabold@gatech.edu	Th 2:00-3:00 Clough 280
Keru Zhou	G05/J02	kzhou315@gatech.edu	Th 12:30-2:30 Clough 280
Neha Dossani	G03/J05	ndossani3@gatech.edu	M 11:00-12:00 Skiles 230

3. Pre-Requisites

- Calculus II: At least one of MATH 1555, MATH 1552, MATH 15X2, MATH 1X52
- Linear Algebra: At least one of MATH 1553, MATH 1554, MATH 1564, MATH 1X53, MATH 1X54

4. Textbook

Thomas, Calculus: Early Transcendentals 15th edition by Addison-Wesley (Pearson). The textbook is not required for the class; many good references for the material of MATH 2550 can be found online or at the campus library.

A few online resources are listed below in no particular order:

- OpenStax Multivariable Calculus
- APEX Calculus
- Active Calculus - Vector Calculus
- Diana Davis' Multivariable Calculus
- Paul's Online Notes
- Khan Academy Multivariable Calculus

5. Course Websites

Sal's Website: sbarone7.math.gatech.edu/ma2550f25.html
Sal's Website is where to go for the majority of course resources including the syllabus, course schedule, lecture notes, Classwork Points (CPs) resources, quizzes, sample exams, and the course letter grade calculator.

Canvas Page: gatech.instructure.com
Canvas will be used for course grades, announcements, accessing WeBWorK, and signing up for Gradescope/Piazza. Links to the other websites in this section can be found on Canvas as well.

Piazza Discussion Board: piazza.com Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza if your questions have nothing to do with your privacy. The only restriction on questions I impose on Piazza is: please do not discuss exam problems until after grades are released.

WeBWorK: We will use the free homework platform WeBWorK for homework in this course. You will access WeBWorK through the Assignments tab in Canvas. Some information about entering answers into WeBWorK can be found

online here, or you can ask on Piazza if you are having difficulty with the format of any answer.

Gradescope: Grading of quizzes and exams will be done on Gradescope. The first time you access Gradescope will be through Canvas, after which you can go directly to gradescope.com.

Dr. H's Personal MATH 2551 Webpage: https://hunterlehmann.github.io/teaching/MATH2551/

6. Course Requirements & Grading

6.1 Homework

Homework will be due on **Friday's at 11:59 pm** through WeBWorK. There are a total of 182 homework points available in the course. The homework component of your grade will be **the fraction of points you earn out of 100**, capped at 100%. If you complete all of the weekly homework sets, you will meet the point cap. The practice problem sets and review problem sets are there to give you some leeway with the weekly assignments and to provide extra practice should you desire it for exams. All homework due dates are posted already in WeBWorK and the course calendar.

6.2 Quizzes, Exams, CP's & Regrades

- **Quizzes:** We will have 5 quizzes in Gradescope available for at least two days before the due date. Quizzes are open notes and open book, but you must work alone and submit your own work according to the Georgia Tech Honor Code. Quiz submissions copied from ChatGPT or other online sources will receive a zero and will be submitted to OSI for disciplinary action. Each of the 5 quizzes are worth 30 points each for a total of 150 points. The quiz component of your grade will be **the fraction of points you earn out of 120**, capped at 100%.
- **Midterm Exams:** We will have two midterm exams, which will take place **during lecture** on the following dates:

  1. Exam 1 on Monday, September 22 [covers 12.1-12.6, 13.1-13.4, 14.1-14.2]
  2. Exam 2 on Monday, November 3 [covers 14.3-14.8, 15.1-15.4]

  During exams each student must turn off their cell phone and zip it in their bag, remove all ear buds and headphones, and leave their bags at the front of the room. Students without a bag to zip their phone in must leave their cell phone at the front of the room during the exam.
- **Regrades:** Exams will be graded through Gradescope. Once an exam is graded, you will have one week to submit a regrade request. Regrade requests that do not explain why your solution is correct and which rubric item [#] should be applied will not be considered. A regraded paper may be regraded up **or down**, so please check the answer key before submitting a regrade request. Only exams are eligible for regrade requests.
- **Final exam:** The final exam is not optional and covers all the material from the course roughly equally, including the content from the first two midterm exams.

  Our final will be on Friday, December 5 at 2:40-5:30pm for Section G, and Wednesday, December 10 at 2:40-5:30pm for Section J. For the full final exam schedule, see the registrar's schedule. **Only under extreme extenuating circumstances** will you be able to take the final exam at a different time or date. Early travel plans (including already-purchased tickets) are **not** an acceptable reason for this.

6.3 Grade breakdown

Your final grade in the class will be computed according to the table below. Canvas will not accurately reflect your grade during the semester!

Grading scheme:
5% Homework
15% CPs
10% Quizzes
25% Higher Midterm Exam Score
15% Lower Midterm Exam Score
30% Final Exam Score

6.4 Grade Incentives

CP's: There will be an opportunity for Classwork Points (CP's) throughout the semester, which are additional assignments that can potentially add to your homework or quiz score (if less than the 100pt/120pt cap for homework/quizzes). The CP's will be offered throughout the semester in the following formats:

(a) peer assessment (PA) activities in studio or lecture [up to 12CP each, ∼8 expected, 96CP total],

(b) handwritten homework (HWHW) assignments [up to 6CP each, make-up PA points by email request, 96CP total],

Students are expected to participate in class, especially for the PA activities. Students will receive full credit in the CPs portion of the final grade if they accumulate at least 40CPs throughout the semester. Any additional CPs over the 40pt cap will be converted to quiz or homework points.

Additional CP points above the 40pt cap will only have the possibility to increase your homework/quiz grade if you are not already at the homework/quiz cap, and they can not increase the grade of either category to be over 100%. At the end of the semester, any accumulated CP's over 40pt will first be added to the Quiz score (up to the 120pt cap) at a rate of 1CP=0.5pt, then the remainder will be added to the Homework score (up to the 100pt cap) at a rate of 1CP=0.5pt. Any excess CP's will then be added to the final course grade at a rate of 1CP=0.01% of your course grade.

Any student found responsible for an Academic Integrity violation during the semester forfeits any CP's over 40pt accumulated during the semester, and must rely on the standard homework/quiz cap to determine their course grade.

6.5 Grade assignments

After *all* grades are in and all overall percentage scores for students have been computed using the weights described above, grades are assigned. The standard cutoffs are as follows.

A: [90%, 100%] B: [80%, 90%) C: [70%, 80%) D: [60%, 70%) F: [0%, 60%)

So, to guarantee an A, get 90% or better overall. Grades will not be rounded. To guarantee at least a B grade, get 80% or better overall, etc.

7. Course Expectations & Guidelines

7.1 Students with Disabilities and/or in need of Special Accommodations

Georgia Tech complies with the regulations of the Americans with Disabilities Act of 1990 and offers accommodations to students with disabilities. If you are in need of classroom or testing accommodations, please make an appointment with the Office of Disability Services to discuss the appropriate procedures. More information is available on their website. Please also make an appointment with me to discuss your accommodation, if necessary.

7.2 Statement of Intent for Inclusivity As members of the Georgia Tech community, we are committed to creating a learning environment in which all of our students feel safe and included. Because we are individuals with varying needs, we are reliant on your feedback to achieve this goal. To that end, we invite you to enter into dialogue with us about the things we can stop, start, and continue doing to make the classroom an environment in which every student feels valued and can engage actively in our learning community.

7.3 The Honor Code and Academic Dishonesty

Do not cheat! Abide by the honor code at all times. See http://honor.gatech.edu.
Any evidence of cheating or other violations of the Georgia Tech Honor Code will be submitted directly to the Office of Student Integrity. Cheating includes, but is not limited to:

- Using a calculator, books, or any form of notes on quizzes or tests.
- Copying directly from any source, including friends, classmates, tutors, internet sources, or a solutions manual.
- Allowing another person to copy your work.
- Taking a test or quiz in someone else's name, or having someone else take a test or quiz in your name.
- Asking for a regrade of a paper that has been altered from its original form.

Cheating does not include working together with your friends and classmates on your homework. You may use AI and other tools to help you get started on your homework, but relying heavily on these will likely result in poor performance on quizzes and exams if you do not develop your own understanding of the material. Any student found responsible for an Academic Integrity violation during the semester forfeits any CP's accumulated during the semester, and must rely on the standard homework/quiz cap to determine their course grade.

7.4 Missed work policy

If you have to miss class on a day when an exam is scheduled due to sickness, institute approved absence, or any other personal emergency, I will work with you to make up the assessment as long as you are in communication with me in a timely manner.

- **University-approved absences**: Please give me notice by the second Wednesday of the semester, or as soon as possible once your absence has been approved.
- **Religious holiday**: By the second Wednesday of the semester, you should notify me of any classes (including studio) you will miss due to religious holidays.
- **Illness**: Except under extenuating circumstances, you should notify me *in advance* and for cases where you are ill enough to need medical care, provide the Office of Student Life with appropriate documentation, so that they can confirm it with me. Illnesses such as COVID, colds, flu, or other such illnesses where you feel unwell and don't want to infect others but do not feel ill enough to visit a doctor do not need documentation.
- **Family or personal emergency**: Notify me as soon as possible and when applicable (for extended absences) provide the Office of Student Life with appropriate documentation, so that they can confirm it with me.

If you do not communicate with me about your absence to set up a make-up opportunity within 24 hours of the missed exam, then the missed exam will be scored as a 0.

If you have an excused absence for an exam, then you will need to take the make-up exam on Thursday at 11am during the same week as the regular exam date. If this is not possible, then the missed exam grade will come from the average of the remaining exams (for a missed Exam 1) or solely from the final exam score (for a missed Exam 2).

Except in extremely rare circumstances, only one make-up exam per student is allowed. If a second make-up exam is required for any reason, then instead the second missed exam grade will come solely from the final exam.

In the case of an excused absence for a peer assessment, you will be able to make up the peer assessment points with two handwritten homework submissions if you email me within 24 hours of the missed peer assessment. Otherwise, your grade for the missed peer assessment will be a 0 and you must complete other peer assessments to reach the cap. See the section on CP points for details.

There are no extensions or make ups allowed for homework or quizzes. If you miss the deadline for any homework or quiz, please complete other assignments in the same category or complete additional CP assignments to get up to the required cap for full credit.

7.5 Email policy

I will respond to emails within one to two business days. Emails sent on the weekend will receive a response on Monday.

For questions relating to course structure, please check the syllabus first. Exam dates are available on the syllabus.

Let's not discuss grades by email. Any questions about grades should be asked during office hours or in an appointment scheduled outside of office hours. **In particular, do not send me emails at the end of the semester asking for your grade to be changed. They will not help in any case.**

Let's not discuss math by email. Let's discuss mathematics on Piazza instead! This will open the question to the entire class, including all TAs and other students who may be able to provide insight. We can also discuss questions during office hours, or at a scheduled appointment outside of office hours.

7.6 Extra credit & calculators

There is **no extra credit**, except what is already explained in the section on CP points. There are no re-takes on exams.

You can use calculators to check your computations when doing homework. You are **NOT allowed to use a calculator on exams**.

7.7 Attendance in lecture and studio

You are expected to come prepared and actively participate in every lecture and studio session.

Class disruptions of any kind will not be tolerated and may result in your removal from the classroom. Please show courtesy to your fellow classmates and instructor by adhering to the following class rules: keep use of electronic devices focused on class-related activities, come to class on time and stay for the entire class period, refrain from conversing with your fellow students about non-mathematical topics during class, and put away any reading materials unrelated to the course.

In the event of an absence, you are responsible for all missed materials, assignments, and any additional announcements or schedule changes given in class.

7.8 Waitlists, Registration, Permits, etc.

Instructors are forbidden from doing anything regarding class registration. They cannot issue permits, remove students from waitlists, etc. For guidelines on such matters, please consult https://math.gatech.edu/permits-and-waitlists.

7.9 Digital Learning Days: In cases where campus may be physically closed due to events such as inclement weather, a digital learning day may replace in-person classes. Should this event occur on a lecture day, then lectures will either be streamed live, or a recording will be posted for students to watch asynchronously. Should this event occur on a studio day, then studios will be streamed live if possible or a recording will be posted for students to watch asynchronously (possibly after the digital learning date); studio sections may be combined if there are TAs who are unable to stream class live. No studio participation will be counted on a digital learning day and classwork points will be adjusted accordingly. If a digital learning day occurs on a midterm exam date, then class lectures will meet online or asynchronously instead, and that exam will be rescheduled to the next lecture day.

8. Campus Resources

In this section you can find resources on campus that are designed to help you succeed as best as possible.

8.1 Additional resources and tutoring

The Math Lab offers tutoring, and there is also free **1-to-1 tutoring**. If appointments are full when you are available, you may request additional tutoring. We also have PLUS sessions. A comprehensive list of tutoring resources is available here.

8.2 Georgia Tech Resources for Personal Support

The Office of the Dean of Students: 404-894-6367; Smithgall Student Services Building 2nd floor. You also may request assistance here

Counseling Center: 404-894-2575; Smithgall Student Services Building 2nd floor
Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, referral services, and crisis intervention. Their website also includes links to state and national resources. Students in crisis

may walk in during business hours (8am-5pm, Monday through Friday) or contact the counselor on call after hours at 404-894-2204.

Students' Temporary Assistance and Resources (STAR) Can assist with interview clothing, food, and housing needs.

Stamps Health Services: 404-894-1420; Primary care, pharmacy, women's health, psychiatry, immunization and allergy, health promotion, and nutrition.

OMED: Educational Services
Women's Resource Center: 404-385-0230
LGBTQIA Resource Center: 404-385-2679
Veteran's Resource Center: 404-385-2067
Georgia Tech Police: 404-894-2500