

Math 2551 Spring 2024 Full Syllabus

(Jan 8, 2024 Version)

[Multivariable Calculus, 4 Credit hours, (B) CRN27713 and (D) CRN27714 and (HP) CRN 332292]

Lectures: Tuesday, Thursday in person in Howey Physics.

For the B Section, lectures run from 8 to 9:15 in Howey Physics L1.

For the D and HP sections, lectures run from 9:30 to 10:45 in Howey Physics L3.

Lectures will be recorded, and recordings placed in Media Gallery. Students may also watch lectures remotely through Zoom. A link will be sent before classes.

Studios: Monday, Wednesday in person. *One TA will record their studio and the recording will be placed in Media Gallery.*

B and HP Section studios:

B01 (CRN24884): Yuchen Zhu, Monday, Wednesday, in Skiles 246 from 9:30-10:20

B02 (CRN24885): Anand Hande, Monday, Wednesday, in Skiles 156 from 9:30-10:20

B03 (CRN24886): Yuchen Zhu, Monday, Wednesday, in Skiles 246 from 8:25-9:15

B04 (CRN27233): Anand Hande, Monday, Wednesday, in Skiles 156 from 8:25-9:15

B05 (CRN29543) and HP1 (CRN32299): Arya Nahri, Monday, Wednesday, in Skiles 168 from 9:30-10:20

B06 (CRN29545): Arya Nahri, Monday, Wednesday, in Skiles 257 from 8:25-9:15

D Section studios:

D01 (CRN24887): Zachary Langston, Monday, Wednesday, in Skiles 170 from 11:00-11:50

D02 (CRN24888): Aravinth Natarajan, Monday, Wednesday, in Skiles 246 from 11:00-11:50

D03 (CRN324889): Zachary Langston, Monday, Wednesday, in Skiles 170 from 12:30-13:20

D04 (CRN30560): Ruben Ascoli, Monday, Wednesday, in Skiles 246 from 12:30-13:20

Instructor Information

Doron Lubinsky, lubinsky@math.gatech.edu,

Office hours: Tuesday, Thursday 12:00-13:00 via Zoom or in person in Skiles 237A

TA Contact Information

B01, B03: Yuchen Zhu, yzhu738@gatech.edu

B02, B04: Anand Hande, ahande3@gatech.edu

B05, B06, HP1: Arya Nahri, anahri3@gatech.edu

D01, D03: Zachary Langston, zlangston3@gatech.edu

D02: Aravinth Natarajan, anatarajan62@gatech.edu

D04: Ruben Ascoli, rascoli3@gatech.edu

General Information

Description

The course provides an introduction to multivariable calculus. It begins with a study of geometrical objects in several dimensions, including vectors, lines, planes, and quadric surfaces. It continues with differentiation and integration of vector functions, with some applications. Then there is a study of partial differentiation, and its application to problems of minimization and maximization, including the method of Lagrange multipliers. The next part of the course deals with integration of functions of two and three variables, emphasizing Fubini's Theorem and its applications. The last section deals with Green's Theorem, Gauss' divergence theorem, and Stokes' Theorem, and their applications.

Pre- &/or Co-Requisites

[MATH 1502](#) OR [MATH 1512](#) OR [MATH 1555](#) OR [MATH 1504](#) (([MATH 1552](#) OR MATH 15X2 OR MATH 1X52) AND ([MATH 1522](#) OR [MATH 1553](#) OR [MATH 1554](#) OR [MATH 1564](#) OR MATH 1X53))

Course Goals and Learning Outcomes

- Apply dot and cross products to describe relationships between points, lines, and planes.
- Describe the motion of an object in 3 dimensions.
- Apply partial derivatives to approximate functions using Taylor's formula, tangent planes, and differentials; and solve constrained and unconstrained optimization problems.
- Calculate integrals of functions of several variables in rectangular, cylindrical, and spherical coordinates
- Calculate volumes and centers of mass
- Calculate flow and divergence using the theorems of Gauss, Green, and Stokes
- Justify your reasoning in presenting solutions to problems

Course Requirements & Grading

There will be regular MyLab Homework, 3 midterm tests, a final exam, and some quizzes

The items are weighted as follows:

MyLab Homework: 15%

Quizzes: 10%

Midterm tests: 50% (The two best tests count 20% each, and the lowest midterm counts 10%)

Final exam: 25%

No extra credit.

Description of Graded Components

MyLab Homework

There will be regular MyLab homework, typically once or twice a week, throughout the course. Homeworks for a chapter are posted well in advance, so there is **no allowance for late submission**. You may find the homework deadlines in Assignment Manager in MyLab. In case of medical emergency, homeworks can be dropped for individual students. There are four attempts per question. You should register for MyLab and access all homeworks through Canvas. **You can click on "Pearson Access" in Canvas to link to MyLab.**

Quizzes

These will be conducted online through Gradescope. They will be released on Gradescope on Wednesdays with a fixed 14 hour time window. Students must upload their solutions to Gradescope before the time window closes. It is expected that each quiz should not take more than 15 minutes to complete. Once a student opens the Gradescope form, they have an hour to complete it.

Tentative dates of Quizzes

Wednesday 17 January: Quiz 1

Wednesday 24 January: Quiz 2

Wednesday 7 February: Quiz 3

Wednesday 14 February: Quiz 4

Wednesday 21 February: Quiz 5

Wednesday 28 February: Quiz 6

Wednesday 13 March: Quiz 7

Wednesday 27 March: Quiz 8

Wednesday 17 April: Quiz 9

Midterm Tests

There will be 3 midterm tests, written during studios.

Tentative dates of tests:

Test 1: Wednesday 31 January

Test 2: Wednesday 6 March

Test 3: Monday 1 April

STUDENTS WHO ARE IN A DIFFERENT TIME ZONE AND WHO HAVE INSTITUTE PERMISSION TO WRITE REMOTELY MUST STILL TAKE THEIR TESTS REMOTELY DURING THE SCHEDULED TIME.

There will be practice tests and a review session before each midterm. Tests are closed book - you should not use notes, the textbook, cheatsheets, nor calculators of any type unless specifically specified on an individual test.

The current plan is that tests will be written in person, during studios.

If Covid concerns necessitate this, midterm tests will be conducted remotely, through Gradescope. Students will then be required to sign onto Zoom, and keep on their laptop cameras, while they are monitored by TA's. They will be given about 15 minutes after the test to take a scan of their solutions using their cellphones, combine them into a single PDF, and then upload them to Gradescope.

Final Exam

The final exam will be comprehensive.

For the B and HP sections, it is scheduled for Thursday May 2, 8:00-10:50AM.

For the D sections, it is scheduled for Monday April 29, 8:00-10:50AM.

The current plan is that it will be written in person in class, but this may change due to Covid concerns.

Makeup Tests

These will only be given where there is a medical certificate provided, or approved university absence.

COVID IMPACT ON TESTS AND LECTURES

Covid issues might force a change to the above arrangements for lectures and tests.

Grading Scale

You can be guaranteed at least the following grades if your percentage lies in the specified range:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

There will also be a curve that might allow e.g. an A for a grade slightly lower than 90%. This is decided at the end of the course based on the distribution of final percentages in the class.

According to policy, grades at Georgia Tech are interpreted as follows:

A	Excellent (4 quality points per credit hour)
B	Good (3 quality points per credit hour)
C	Satisfactory (2 quality points per credit hour)
D	Passing (1 quality point per credit hour)
F	Failure (0 quality points per credit hour)

See <http://registrar.gatech.edu/info/grading-system> for more information about the grading system at Georgia Tech.]

Course Materials

Course Text

Thomas' Calculus (Early Transcendentals), Fifteenth Edition, Pearson. You will be using an online version of Thomas, together with MyLab.

Additional Materials/Resources

Course Website and Other Classroom Management Tools

The worksheets, practice tests, test information sheets, solutions to tests, and handwritten class notes will all be posted in folders in “Files” in Canvas. Grades will be posted in Canvas.

There will be a weekly announcement posted in Canvas.

Additional Help from Math Lab: *Asking questions is a key to success!* Free “drop-in” help is available in the **Math Lab**. The Math Lab is staffed by math Graduate Teaching Assistants (GTAs).

A live schedule can always be found on the Tutoring & Academic Support website: <https://tutoring.gatech.edu/drop-in/>. Any questions about the Math Lab can be directed to dropintutoring@gatech.edu.

Course Expectations & Guidelines

Students are expected to take their responsibilities seriously, attend class either remotely or later watch the recorded lectures, behave respectfully to fellow students, and to TA's and the instructor. They should complete all homeworks in a timely manner, and ask for help where appropriate.

The instructor is expected to provide clear lectures and instructions for the components of the course, to treat students courteously, to ensure fair and timely grading, to allow regrades, and to coordinate the course conscientiously.

The TA's are expected to run the studios professionally, to assist in grading, and to run regular office hours.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit <http://www.catalog.gatech.edu/policies/honor-code/> or <http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Collaboration & Group Work

Students may discuss homework problems with each other, but should complete their own solutions. There must not be any communications between fellow students during tests.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Makeup Tests

These will only be given where there is a medical certificate provided, or approved university absence.

There is no allowance for late homework submission. In cases of medical emergency, missed homework assignments will not be counted.

Student Use of Mobile Devices in the Classroom

This is not allowed.

Campus Resources for Students

In your time at Georgia Tech, you may find yourself in need of support. Below you will find some resources to support you both as a student and as a person.

Academic support

- Center for Academic Success <http://success.gatech.edu>
 - 1-to-1 tutoring <http://success.gatech.edu/1-1-tutoring>
 - Peer-Led Undergraduate Study (PLUS) <http://success.gatech.edu/tutoring/plus>
 - Academic coaching <http://success.gatech.edu/coaching>
- Residence Life's Learning Assistance Program
<https://housing.gatech.edu/learning-assistance-program>
 - Drop-in tutoring for many 1000 level courses
- OMED: Educational Services (<http://omed.gatech.edu/programs/academic-support>)
 - Group study sessions and tutoring programs
- Communication Center (<http://www.communicationcenter.gatech.edu>)
 - Individualized help with writing and multimedia projects
- Academic advisors for your major
<http://advising.gatech.edu/>

Personal Support

Georgia Tech Resources

- The Office of the Dean of Students: <http://studentlife.gatech.edu/content/services>; **404-894-6367**; Smithgall Student Services Building 2nd floor
 - You also may request assistance at https://gatech-advocate.symplicity.com/care_report/index.php/pid383662?
- Counseling Center: <http://counseling.gatech.edu>; **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):
<http://studentlife.gatech.edu/content/need-help>
 - Can assist with interview clothing, food, and housing needs.
- Stamps Health Services: <https://health.gatech.edu>; **404-894-1420**
 - Primary care, pharmacy, women's health, psychiatry, immunization and allergy, health promotion, and nutrition
- OMED: Educational Services: <http://www.omed.gatech.edu>
- Women's Resource Center: <http://www.womenscenter.gatech.edu>; **404-385-0230**
- LGBTQIA Resource Center: <http://lgbtqia.gatech.edu/>; **404-385-2679**
- Veteran's Resource Center: <http://veterans.gatech.edu/>; **404-385-2067**
- Georgia Tech Police: **404-894-2500**

Statement of Intent for Inclusivity

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

Tentative Course Schedule

Section numbers refer to the text book. This schedule is not definitive and just a rough guideline

Week 1: January 8-12: Sections 12.1-12.6.

Week 2: January 15-19: Sections 13.1-13.5.

Week 3: January 22-26: Sections 13.5, Section 14.1-3.

Week 4: January 29-31, February 1-2: Sections 14.3-14.4, Test 1.

Week 5: February 5-9: Sections 14.4-14.7.

Week 6: February 12-16. Sections 14.7-14.9, Section 15.1 (Progress report due February)

Week 7: February 19-23: Sections 15.2-4.

Week 8: February 26-29, March 1: Sections 15.4-15.6

Week 9: March 4-8: Sections 15.6-15.8, Test 2

Week 10: March 11-15: Sections 15.8, Section 16.1

Week 11: Spring Break: March 18-22.

Week 12: March 25-29: Sections 16.1-16.3

Week 13: April 1-5: Sections 16.4-16.6, Test 3

Week 14: April 8-15: Sections 16.5-16.7.

Week 15: April 15-19: Sections 16.8, Review

Week 16: April 22-24: Review.