

Math 2552: Differential Equations
Sections C01-C02-C03
Georgia Institute of Technology
Fall 2021

Lecture Information

Instructor: Austin Christian Email: austin.christian@math.gatech.edu
Office: BlueJeans (see meeting location) Office Hours: See website, and by request.
Meeting locations: BlueJeans (<https://bluejeans.com/760982189>)
 Architecture (East) 123
Meeting time: TR 9:30am-10:45am, and via recording.

Studio Information

Section	Meeting Details	Teaching Assistant
C01	MW 12:30pm-1:20pm, Skiles 154	Logan Hart lhart31@gatech.edu Office Hour: W 3:00pm-4:00pm
C02	MW 2:00pm-2:50pm, Guggenheim 244	Weiwei Zhang wzhang393@gatech.edu Office Hour: M 3:00pm-4:00pm
C03	MW 2:00pm-2:50pm, Guggenheim 264	Logan Hart lhart31@gatech.edu Office Hour: W 3:00pm-4:00pm

Class Modes and the Pandemic

The instructors and TAs hope to provide an in-class experience for students as much as possible this semester. However, at times, it may be necessary for classes to move fully online due to a rise in COVID-19 cases on campus, or illness/isolation of the instructor or TA. We will notify students as soon as possible if any classes will meet online. We also strongly encourage students who are sick to stay home, so that we can safely continue to offer as many in-person events as possible. Students are strongly encouraged to vaccinate, mask, and test regularly to keep our campus community safe.

Lectures are delivered synchronously on BlueJeans and recorded, in addition to the in-person delivery. At least one of the studio sections will also be live streamed and recorded to accommodate students who cannot physically attend. We do not record attendance of lectures and studios. All assignments (homework, quizzes, midterms, and the final exam) will be posted on Canvas. In particular, **it is possible to take this course completely remotely**.

On the day you plan to come to any in-person lecture/studio/office hours, please complete the daily self-screening beforehand: <https://health.gatech.edu/coronavirus/daily-checklist>. If you have symptoms on this list, please refrain from attending the in-person session.

Out of concern for everyone's health, the instructor and TAs will wear masks in all in-person settings. We ask that you give us and your fellow classmates this same consideration. We understand that wearing a mask can be an inconvenience, but they have been shown to slow the spread of the SARS-CoV-2 virus. If you would prefer not to wear a mask, please take advantage of the many virtual options afforded in this class. Your cooperation and understanding on this matter are much appreciated.

General Information

Description

Various analytic solution methods of elementary differential equations. Applications of differential equations to real world problems with modeling. Qualitative studies of solutions emphasizing stability/instability.

Pre-/co-requisites

Formally, (Math 1502 OR Math 1512 OR Math 1555 OR Math 1504) AND (Math 1522 OR Math 1553 OR Math 1554 OR Math 1564 OR Math 1X53). Informally, this class will require lots of calculus and linear algebra, as well as a positive outlook!

Course Goals and Learning Outcomes

Upon successful completion of this course, the student should be able to solve first order linear diff equations, solve separable diff equations, solve linear systems of diff equations with constant coefficients, solve higher order linear diff equations with constant coefficients, solve some real world problems by using diff equations, analyze the stability/instability of solutions of some linear and nonlinear diff equations, and use basic numerical methods to approximately solve diff equations.

Course Requirements and Grading

There will be weekly homework, 9 quizzes (30 minutes), 2 midterms (60 minutes), and a cumulative final exam (2 hours 30 minutes), all to be accessed via Canvas. Dates for quizzes and exams are below.

Assessment	Date	Time Limit	Time Window
Quiz 1	9/1 (Wed)	30 minutes	9am-10pm ET
Quiz 2	9/8 (Wed)	30 minutes	9am-10pm ET
Quiz 3	9/15 (Wed)	30 minutes	9am-10pm ET
Quiz 4	9/22 (Wed)	30 minutes	9am-10pm ET
Midterm 1	10/5 (Tue)	60 minutes	9:30am-10:45am ET
Quiz 5	10/20 (Wed)	30 minutes	9am-10pm ET
Quiz 6	10/27 (Wed)	30 minutes	9am-10pm ET
Quiz 7	11/3 (Wed)	30 minutes	9am-10pm ET
Midterm 2	11/16 (Tue)	60 minutes	9:30am-10:45am ET
Quiz 8	11/22 (Mon)	30 minutes	9am-10pm ET
Quiz 9	12/1 (Wed)	30 minutes	9am-10pm ET
Final Exam	12/16 (Thu)	2 hours 30 minutes	8am-10:50am ET

Notice that quizzes have a large window. For example, Quiz 1 will be released on Canvas at 9am ET on September 1. Once you open the quiz, you have up to 30 minutes to write your solutions, scan your work into a PDF file, and upload on Canvas. The latest time you can upload is 10pm ET. We suggest you write your solutions in 20 minutes, and give yourself 10 min to scan and upload. **Late submissions are not accepted.** Once submitted, you will not be able to replace the file.

Midterms are scheduled during lecture times. For instance, Midterm 1 will be released on Canvas at 9:30am on October 5. Once you open the midterm, you have up to 60 minutes to write your solutions, scan your work into a PDF file, and upload on Canvas. The latest time you can upload is 10:45am ET. We suggest you write your solutions in 50 min, and give yourself 10 min to scan and upload. **Late submissions are not accepted.**

Online Homework

Homework will be assigned via WeBWorK, which will be accessed under the 'Assignments' tab in Canvas. Assignments will be due approximately weekly. The warmup assignment for the first week of class on WeBWorK is just for practice and will not be graded.

Assignments will be open at least one week before they are due. Your two lowest homework scores will be dropped. No late homework will be accepted. Each homework assignment counts equally toward your grade.

Extra Credit Opportunity

There are exactly two opportunities for extra credit in this course:

- **Mask use in lecture room.** (max 1% extra credit) If everyone attending an in-person lecture meeting wears a mask, this will be recorded, and the whole Section C (including those who did not attend the lecture in-person that day) will receive extra credit. There are in total 29 lecture meetings in the semester. Each lecture meeting counts equally toward this extra credit.
- **Mask use in studio room.** (max 1% extra credit) If everyone attending an in-person studio meeting wears a mask, your TA will record this, and the whole studio section (including those who did not attend the studio in-person that day) will receive extra credit. There are in total 28 studio meetings in the semester. Each studio meeting counts equally toward this extra credit.

A fraction of a percentage point of extra credit may not sound impressive, but it can make a big difference for borderline grades at semester's end!

Description of Graded Components

Your course average will be the highest of the following three numbers:

Scheme 1	5% (homework) + 30% (quizzes) + 34% (midterms) + 31% (final)
Scheme 2	5% (homework) + 24% (quizzes, with two dropped) + 34% (midterms) + 37% (final)
Scheme 3	5% (homework) + 30% (quizzes) + 17% (better midterm) + 11% (lower midterm) + 37% (final)

Any extra credit (up to 2 percentage points) will be added onto your score at the end of the semester.

Grading Scale

Your final grade will be assigned as a letter grade. The scale will be **no more harsh than**:

A	B	C	D	F
$[90, \infty)$	$[80, 90)$	$[70, 80)$	$[60, 70)$	$(-\infty, 60)$

Course Materials and Technologies

Course Text

James R. Brannan and William E. Boyce, *Differential Equations (An Introduction to Modern Methods and Applications)*, 3rd Edition, John Wiley & Sons, 2015. Publisher's website for the text: <http://www.wiley.com/WileyCDA/WileyTitle/productCd-EHEP003244.html>

We plan to cover Chapters 1-8 of the text.

Course Websites

- Austin's page (<https://austinchristian.math.gatech.edu/teaching/2552-f21/>) will have basic information and a tentative schedule.
- Canvas (<https://gatech.instructure.com/courses/212082>) will be used for the gradebook, announcements, lecture recordings, and class notes.
- Gradescope (accessed through Canvas) will be used to return graded assessments, with the exception of homework. This is also where you can submit regrade requests.

- Discord (<https://discord.gg/qAXyd24sTQ>). I've created a Discord server for our class. Rather than emailing questions to the teaching staff, please post your (non-private) questions to our server. This will lead to quicker responses, and reduces duplicate questions. The server should also be useful for organizing study groups and for interacting as one large class. **Note:** Please apply common sense to your use of our Discord server. Do not discuss exam/quiz problems and solutions, do not post illegal or inappropriate content, and do not post commercial advertisements.

Email Protocol

Our plan is to not have math discussions by email this semester. Math questions should be posted on Discord, so that everyone in the class has a chance to hear the question. (Feel free to ask your questions anonymously.) Any math questions emailed to the teaching staff will be redirected to Discord.

We will also not discuss grades by email. Any questions about grades (including “the curve”) should be asked during office hours or in an appointment scheduled outside of office hours.

If you do need to email the teaching staff about something, please start with your TA, to see if it's something they can handle. If it isn't, the matter can be escalated to Austin. (It's not that I don't want to hear from you — I just want to ensure quick response times.) In all email correspondence related to this course, please include [Math 2552] somewhere in the subject line.

Course Expectations and Guidelines

Academic Integrity

Cheating is stupid, and you shouldn't do it.

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. Cheating includes, but is not limited to:

- Collaborating during an online quiz or test.
- Using any third-party websites such as Chegg and CourseHero to obtain answers or hints to graded problems.
- 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.
- Using someone else's account to gain attendance or homework points for them, or asking someone else to use your account for any graded homework or attendance submission.

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 email me as soon as possible in order to set up a time to discuss your learning needs.

Lecture Format and Attendance

All lectures will be delivered in three formats: in person, synchronously on BlueJeans, and via recording, to be made available on Canvas. Synchronous attendance is not mandatory, but is highly encouraged.

Studio Format and Attendance

All studios will be in-person, and at least one of the three studio sections will be available synchronously on BlueJeans, as well via recording. Students in any studio section may attend the BlueJeans section and view the recordings. Synchronous attendance is not mandatory, but is highly encouraged.

Class Etiquette

Whether attending class in-person or online, please be respectful of your classmates and instructors. In person, please refrain from personal conversations and any behavior that might be distracting to your classmates or instructors. Online, feel free to use the chat feature to ask relevant questions, but refrain from posting inappropriate content or engaging in unrelated discussions.

We will maintain a respectful, inclusive classroom culture, and **disrespect of your classmates or instructors will not be tolerated.**

Exam Procedure

- All exams (quizzes, midterms, and the final) are take-home assessments with time limits and time-windows.
- Problems will be released under the 'Assignments' tab on Canvas at a pre-announced time.
- You will scan your solutions into a PDF file, and upload it to Canvas by a pre-announced deadline.
- You have to solve the problems by yourself, and are not allowed to discuss problems and solutions with other people.
- Please make sure your PDF submissions are in required format (which will be specified in the exam problem files).
- During the midterms and the final exam, I will be on BlueJeans. If you have questions about the exam, you can join the BlueJeans meeting. We can only answer one person at a time without the presence of other people; so please leave BlueJeans once your questions are answered or if you have no questions.
- We will post a practice quiz that is not graded. You are strongly encouraged to use it to practice scanning and uploading. We suggest to time yourself during the practice.

Rescheduled or Missed Exams

- In general, no make-up exams (including quizzes, midterms, and the final exam) will be given and any missed exam results in a score of 0.
- If you have a valid reason to request a make-up exam, please contact Austin as early as possible, before the release time of the exam, with a reasonable written documentary evidence supporting your case. Only extraordinary cases will be considered.
- In the case of serious illness or family emergency, please contact the Dean of Students. They will verify the case and communicate with us if necessary.
- No makeups will be scheduled after the corresponding exam has been graded and returned to other students.

Regrade Requests

Any regrading request should be submitted on Gradescope, with an explanation of the reason, within two weeks of the date the graded exam has been returned to you. **Papers submitted for regrading could be adjusted up or down;** so please make sure to check the solutions before submitting a regrading request.

Optional Exercises

Optional exercises will be listed on the course schedule: <https://austinchristian.math.gatech.edu/teaching/2552-f21/>.

These exercises are different from the homework on Canvas and are not collected. I do strongly suggest you to attempt all of the assigned exercises. In order to get a good understanding of the course material, the minimum work you need to do consists of four parts: read the text, review the examples discussed in lectures and studios, do online homework, and solve exercise problems.

Student-Faculty Expectations Agreement

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

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

- Drop-In Tutoring/Math Lab: <https://tutoring.gatech.edu/drop-in/>
 - The Math Lab offers free drop-in math help, and is staffed by math Graduate Teaching Assistants (GTAs).
 - Out of an abundance of caution due to the COVID-19 pandemic, the math lab will take on two forms this semester:
 - * “Virtual Math Lab” from 8/30 to 9/10 via BlueJeans/Teams
 - * “Outdoor Math Lab” from 9/13 to 12/7, Skiles Courtyard
 - Hours will include Monday-Thursday’s 11am-6pm and Friday’s 11am-3pm.
 - Should health concerns change the format and availability of the Math Lab, I will try to post announcements on the course Canvas page. A live schedule can always be found at the above website, and any questions can be directed to texttttdropintutoring@gatech.edu.
- 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>
- OMED Educational Services: <http://omed.gatech.edu/programs/academic-support>
- Communication Center: <http://www.communicationcenter.gatech.edu>
- Academic advisors for your major: <http://advising.gatech.edu/>

Personal Support

- The Office of the Dean of Students: <https://studentlife.gatech.edu/>; 404-894-6367; Smithgall Student Services Building 2nd floor. You also may request assistance at https://gatech-advocate.symplcity.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): <https://studentlife.gatech.edu/content/star-services>. 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.
- Women's Resource Center: <https://www.womenscenter.gatech.edu>; 404-385-0230.
- LGBTQIA Resource Center: <https://lgbtqia.gatech.edu>; 404-385-2679.
- Veteran's Resource Center: <https://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.

A note from Austin

It is important to me that you not become overwhelmed in this class. Mathematics can be very challenging and is often frustrating, but you shouldn't feel that succeeding in mathematics is impossible. **Everyone is a math person.** If you feel that the coursework is beginning to slip away from you, please let me know *before* you become completely lost. I expect you to invest a lot of time and energy into this course, but I am committed to helping you learn and enjoy the material, and will do my best to help you succeed.

Disclaimer

This syllabus represents my expectations for the content and timing of this course as well as possible. However, because these expectations may change, I reserve the right to modify course policies as the need arises. If this happens, students will be notified by email and in lecture.