

Math 2410  
Ordinary Differential Equations  
Summer 2025

MTWR, 8:30 am–10:30 am in TBA  
June 2–July 3  
Instructor: Prof. Daniel Cuzzocreo  
Email: daniel.cuzzocreo@georgetown.edu  
Office: St. Mary's Hall 315C

The content of this syllabus is subject to change.  
*Updated March 19, 2025*

**Important Dates and Deadlines.**

- **Final Exam: Thursday 7/3**
- **In-class Tests: Thursday 6/12, Thursday 6/26**
- **Quizzes in class each Tuesday and Thursday, except test/exam dates**
- **Homework due each Tuesday and Thursday at 11:59 pm**

**Textbook Information.** The text we will be using for the course is *Differential Equations, 4th ed.* by Blanchard, Devaney, and Hall. The bookstore has ebook and physical copies for rent or purchase. You do not need to purchase a physical copy of the text but you may do this if you wish.

**Course Description.** This is a course in Differential Equations, which concerns equations, and systems of equations, containing an unknown function or functions together with one or more of their derivatives. We'll explore how many kinds of differential equations arise naturally as models of real world phenomena, and analyze their solutions from computational, qualitative, and numerical perspectives.

The qualitative perspective is especially important, and means that for circumstances in which we cannot compute an explicit formula for solutions to a differential equation, we still hope to say as much as possible about how the solutions behave and what properties they might have. Thus our analysis of solutions will often take the form of a written description or short essay (supported by rigorous justification), putting an emphasis on mathematical writing and communication which is often absent from other math courses.

This course covers a semester's worth of university-level mathematics material in 5 weeks. This course will move VERY QUICKLY. We will typically cover about two textbook sections each class day. You are expected to attend class each day, and you MUST complete homework and quizzes on time. Missing even one day of class or one assignment could cause you to immediately fall behind in the course, with detrimental results. It is your responsibility to put sufficient time in outside of class to keep up with homework, reading the textbook, and reviewing your class notes to solidify your understanding of course material. It is also your

responsibility to reach out to me or meet with me during office hours if you find yourself struggling in the course.

**Learning Objectives.** By the end of Math 2410, students will be able to:

- (1) Interpret differential equations as models of real world phenomena.
- (2) Plot phase lines, slope field, and bifurcation diagrams for first order autonomous differential equations.
- (3) Find general solutions of first order differential equations using separation of variables and integrating factors.
- (4) Approximate solutions of first order equations using Euler's method.
- (5) Solve second order linear equations with and without periodic forcing.
- (6) Solve and plot phase planes for 2 dimensional linear systems.
- (7) Use equilibrium point analysis and nullclines to plot phase planes for 2 dimensional nonlinear systems.
- (8) Solve first and second order equations using Laplace transformations and power series expansion.

**Grading Policy.** Your grade will be determined according to whichever of the following schemes results in a higher score:

Scheme A:

<u>Assessment</u>	<u>Percentage</u>
Final Exam	36%
Two Midterm Tests	36% (18 % each)
Homework	18%
Quizzes	10%

Scheme B:

<u>Assessment</u>	<u>Percentage</u>
Final Exam	48%
Best Midterm Test	24%
Homework	18%
Quizzes	10%

Scheme B will be used to drop a test if you do not perform as well as you would have hoped, or if you need to miss a test for any reason.

**Homework.** Twice-weekly problem sets will be assigned, consisting of problems from the textbook and other problems, and submitted on the Gradescope online platform, accessible through Canvas. You may work with classmates on homework problems, but all students working together must contribute to the problem-solving process, and each student must write up final answers on their own. Indicate the names of any classmates you worked with at the beginning of your submitted problem set. See the Written Homework Guidelines document on Canvas for more information.

**Tests.** There will be two midterm tests, and a final exam, taken during class time.

**TEST I: THURSDAY 6/12**

**TEST II: THURSDAY 6/26**

**FINAL EXAM: THURSDAY 7/3 10:45 am– 1:25 pm**

These tests are required course meetings, and students registered for this course must attend these as scheduled. The use of books, notes, phones, computers, laptops, tablets, or calculators on exams and quizzes is prohibited. More information about exam content and policies will be communicated before each exam.

There are no makeup examinations. Students who arrive after an exam has begun will have only the time remaining in the exam period to complete the exam. See policies below regarding missed exams.

**Missed Deadlines and Conflicts.** All dates of exams, quizzes, and assignment deadlines for the entire quarter will be contained on Canvas. It is your responsibility to know these dates, to be present in class for exams, and to turn in assignments on time. No makeup exams will be given. However, mistakes happen and conflicts arise. So that such incidents do not have a detrimental affect on your course grade, the following policies will be in place. Please read them carefully, as **no exceptions** will typically be made.

- **Homework:** You can receive one free 36 hour extension on homework. Email me ASAP after the deadline.
- **Quizzes:** Your lowest quiz score will be dropped.
- **Tests:** If you miss one exam, then that exam score will be dropped and your final grade will be computed according to Scheme B in the Grading Policy section above. No makeup exams will be given.
- Due to the very fast pace and shortened schedule of the summer session, exceptions to these policies will not be made. In the event of extreme personal circumstances that result in missing a substantial amount of class time or coursework, you should speak with me personally, but it may not be possible to make up the missed work within the timeline of the course, and you may need to withdraw from the class.

**Expectations.** This course will be *very* fast-paced. You should expect to put in significant work outside of class to read the textbook, review material from lecture, and fill in gaps, not just work on homework problems. During class, you should engage actively in what we're learning; in particular, think critically as we go about what we're doing, and don't be afraid to ask questions. It will be very important to keep up with homework assignments. Reading along the sections we are covering in the textbook is highly recommended.

Please arrive to class each day on time, and ready to contribute. Please also keep phones silent and out of sight during class. You may use a tablet for note-taking in class but **laptops should not be used during lecture** unless instructed.

**Academic Integrity.** By taking this class, you assume responsibility towards following the policies of Georgetown University's Honor System. If you cheat in this class (e.g. using assistance of any form on exams, presenting someone else's work as your own), you risk failing

the course.

**Accessibility.** It is my job to provide all students with an accessible and inclusive learning environment. Some aspects of this course, the assignments, the in-class activities, and the way the course is usually taught may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Academic Resource Center to determine appropriate accommodations. Any information you provide is private and confidential, and will be treated as such.

**Title IX and Sexual Misconduct.** Georgetown University and its faculty and staff are committed to supporting survivors and those impacted by sexual misconduct, which includes sexual assault, sexual harassment, relationship violence, and stalking. Georgetown requires faculty members, unless otherwise designated as confidential, to report all disclosures of sexual misconduct to the University Title IX Coordinator or a Deputy Title IX Coordinator. If you disclose an incident of sexual misconduct to a professor or staff member in or outside of the classroom (with the exception of disclosures in papers), that faculty or staff member must report the incident to the Title IX Coordinator, or Deputy Title IX Coordinator. The coordinator will, in turn, reach out to the student to provide support, resources, and the option to meet. Please note that the student is not required to meet with the Title IX coordinator and no action will be taken without the student's awareness. More information about reporting options and resources can be found on the Sexual Misconduct Website: <https://sexualassault.georgetown.edu/resourcecenter>.

If you would prefer to speak to someone confidentially, Georgetown has a number of fully confidential professional resources that can provide support and assistance. These resources include:

- Health Education Services: Sexual Assault Response and Prevention: [sarp@georgetown.edu](mailto:sarp@georgetown.edu)
- Counseling and Psychiatric Services (CAPS): 202.687.6985

Additional resources are included below:

- Georgetown Self-Care Resource Guide: <https://studenthealth.georgetown.edu/health-promotion/self-care/>
- Georgetown Wellness Wheel: <https://studenthealth.georgetown.edu/hoya-wellness-wheel/>
- Georgetown Guide to Recognizing Students in Distress:  
<https://studentaffairs.georgetown.edu/studentoutreach/facultystaffresources/>

**Pregnancy Modifications and Adjustments.** Georgetown University is committed to creating an accessible and inclusive environment for pregnant students. At any point throughout their pregnancy students may request adjustments/modifications based on general pregnancy needs or accommodations based on a pregnancy-related complication or medical need. Students may also request accommodations following labor and delivery based on a complication or medical need.

To request pregnancy modifications, please complete the SCS Pregnancy Modification Request Form: <https://forms.gle/ZBfASxui7u13A8TU6>

More information about pregnancy modifications can be found on the Title IX Georgetown University Website: <https://titleix.georgetown.edu/title-ix-pregnancy/student-pregnancy/>