

Math 2562 – Honors Differential Equations - Sample Syllabus

Lectures: TuTh 9:35-10:55am in Howey (Physics), room L4

Differential equations (partial and ordinary) are the language of the universe. To understand the motion of the planets, the spread of disease (or rumors ...), or the stability of buildings during earthquakes, one must first understand differential equations. When an engineer computes the voltage in a circuit, a coroner places the time of death of the victim of a crime or NASA computes the trajectory of a shuttle mission, differential equations are there! Differential equations show up most anytime you look at the world and try to understand it in some quantitative (or qualitative) way. In addition to the vast applicability of ODE's the study of their properties (do there exists solutions? what are the solutions like? how do you find the solutions?) involves an amazing and intricate interplay of linear algebra, calculus and many other areas of mathematics. This is the focus of Math 2562! By the end of this course we should all be familiar with the language of ODE's, methods to study linear ODE's and techniques to push beyond the linear world into the, still developing world, of non-linear ODE's and chaos.

Instructor: George Burdell

E-mail: gpd3@math.gatech.edu (I can answer only if you use your GT account!)

Office Hours: Tu 1:35-3:00pm & Th 8-9:20am in Skiles 243b

Teaching Assistants & Recitations:

Section	TA	Recitations: MW 9:05-9:55am	Office hours
D1	Jamie Conway E-mail: jconway3@math.gatech.edu	Skiles 255	M 10am-12pm Skiles 165
D2	Chenchen Mou E-mail: cmou3@math.gatech.edu	Skiles 246	M 10am-11am Skiles 225C
D3	Amey Kaloti E-mail: ameyk@math.gatech.edu	Skiles 249	M 10-11am, W 4-5pm Skiles 144
D4	Himanshu Sahni E-mail: hsahni3@math.gatech.edu	Skiles 268	W 4pm-5pm Skiles 140
D5	Xin Wang E-mail: xwang320@math.gatech.edu	Skiles 256	MW 10am-11am Skiles 153
D6	Fahmid Sharkar E-mail: fsharkar@gatech.edu	Skiles 257	W 10am-11am Skiles 230

Note Taker Announcement: A student note taker is needed in this course to take notes for a student with a disability. The note taker will be paid a stipend for this assignment. Skills needed are the ability to take accurate, legible, and organized notes and a commitment to attend every lecture. If interested, please contact Karishma Patel or Tina Allen via email at notetaker@vpss.gatech.edu as soon as possible. Be sure to indicate the Professor's name, time, day and course number in the subject line of the announcement.

Textbook: *Differential Equations: An Introduction to Modern Methods & Applications*, by James R. Brannan and William E. Boyce (second edition); John Wiley and Sons, Inc.

Syllabus: We will cover the material in chapters 1 through 7 from the textbook:

- Introduction (Chapter 1)
- First order differential equations (Chapter 2)
- Systems of two first order equations (Chapter 3)
- Second order linear equations (Chapter 4)
- Systems of first order linear equations (Chapter 6)
- Nonlinear differential equations and stability (Chapter 7)
- The Laplace transform (Chapter 5)

Learning Outcomes: On successful completion of the course, students will be able to:
Identify, analyse and subsequently solve physical situations whose behaviour can be described by ordinary differential equations.

Determine solutions to first order differential equations that are separable, linear, or exact.

Determine solutions to certain second order linear differential equations.

Solve systems of first order linear equations

Analyze solutions of nonlinear differential equations and determine stability of solutions.

Applying the Laplace transform method to find solutions.

Grading policy: The grades will be based on the usual scale: A: 90-100%, B: 80-89%, C: 70-79%, D: 60-69%, F: 0-59%. There will be weekly quizzes, two tests, and a comprehensive final exam. Any missed exam results in a "0" score. The lowest quiz score will be dropped. Grades will be computed by the following distribution:

Quizzes	20%
Test 1	20%
Test 2	20%
Final exam	40%

No make-up exams. If you have to miss an hour test for a valid reason (illness or emergency) please let me know as soon as possible. Contact also the Office of Dean of Students immediately and let them send me a notice. In that case the final exam will be given a higher weight.

Test dates:

- Test 1, Wednesday, September 18
- Test 2, Wednesday, October 30
- Final exam, Thursday, December 12, 8:00-10:50am in Howey (Physics), room L4

Please let me know of any conflicts with the test dates immediately.

Policy on exams: Notes, books, calculators, laptops, cell phones, ipods etc. cannot be used! **Bring an ID to all exams!**

Useful links:

- [Course Calendar](#)
- [Sample & Old Tests](#)
- [Georgia Tech Honor Code](#)

- [Tutors and Labs](#) (note that the School of Math offers free help in the Math Lab!)
- [Official school calendar](#)