Course Syllabus

Edit

Math 3410: Differential Equations
Summer 5wk2 2026

Course format. This class will meet in person four (4) times a week for five (5) weeks, beginning on Monday, June 22. Meeting details below:
MoTuWeTh 5:00PM-6:50PM, GAB 112

Instructor. Dr. Tommie Settlemyre (she/her/hers), GAB 442D, tommie.settlemyre@unt.edu (mailto:tommie.settlemyre@unt.edu)

Office hours. In person office hours are held in GAB 442D, unless otherwise announced. Virtual office hours will be through Zoom in Canvas.

Day of week	Time of day
Mondays (in person)	3pm-4pm
Tuesdays (in person)	1:30pm-2:30pm
Wednesdays (in person)	3:30pm-4:30pm
Fridays (virtual)	10:30am-11:30am

Main textbook. We will be loosely following *Elementary Differential Equations and Boundary Value Problems*, by Boyce, DiPrima, and Meade. Any edition will be satisfactory.

Supplemental texts

- Elementary Differential Equations, William Trench, free digital commons textbook. (https://digitalcommons.trinity.edu/cgi/viewcontent.cgi?article=1007&context=mono) (click to download)
- The Ordinary Differential Equations Project, Thomas W. Judson, free

digital commons textbook. **(https://judsonbooks.org/odeproject/odeproject-html/odeproject.html)** (HTML)

- Further resources will be uploaded to Canvas during the term as needed

Course description. First-order equations, existence-uniqueness theorem, linear equations, separation of variables, higher-order linear equations, systems of linear equations, series solutions and numerical solutions. *Emphasis on applications in engineering and the sciences.*

Prerequisites. Calculus II (1720) with a grade of C or higher is required. Linear Algebra (2700) is recommended, but may be taken concurrently.

Attendance. Attendance is required. If you must miss class, let me know ASAP by email or Canvas message. Make-up exams and quizzes will only be administered in limited cases, such as an absence due to a disability (See **Disability accommodations** below) or any other **University Excused Absence.** **(https://policy.unt.edu/policy/06-039)**

Grading.

20% Midterm Exam 1 -- Wednesday, July 1 in class

20% Midterm Exam 2 -- **Thursday, July 16** in class

15% Homework Quizzes

10% Attendance/Participation

35% Cumulative Final Exam -- **Friday**, July 24, at 5:00PM-6:50PM, GAB 112

Homework will be assigned daily. Homework is not to be turned in. Instead, there will be approximately 10-12 "Homework Quizzes" administered in class, with questions adapted from the homework.

Grading scale. This is a challenging course. Accordingly, I will use a relatively generous grading scale as follows:
A: 80-100%; B: 60-79%; C: 50-59%; D: 40-49%; F: 0-39%.

Extra credit. There will be no extra credit.

Calculators. Calculators are not allowed during quizzes or exams.

How to succeed in this course. Once again, *this is a challenging, fast-paced course*. We have a lot of material to cover in just five weeks. Be prepared to spend at least three times as much time studying for this course as you would during a long semester. Take advantage of my **Office Hours**, and get help from the tutors in the **Math Lab**.

Most importantly, *take care of yourself*. You are a human being first. Eat. Sleep. Get some exercise. Spend time with people you love. Furthermore, self-care will improve your ability to learn new math concepts and techniques..

The **Math Lab** (Sage 130) is a walk-in tutoring lab that provides free math tutoring for students enrolled in an undergraduate College of Science course at UNT. The Math Lab is staffed by mathematics graduate students and undergraduate students with a passion for math. Math Lab tutors answer specific questions, check that you are approaching a concept correctly, work with and offer alternative problems, and help clarify concepts.
Math Lab Summer Hours: Mon-Sat 10am-3pm
Online option available Mondays and Saturdays: link-> **Virtual Math Lab (https://unt.zoom.us/j/85227221343)**

Classroom expectations. Students are expected to arrive on time to class, take notes, participate in class discussions/activities, and pay attention for the duration of the class period. There will be a ten-minute break in the middle of class. The use of electronic devices (such as cell phones, laptops, tablets) is prohibited in class, except during the break. Devices required for disability accommodation are exempted (see Disability Accommodations below).

Acceptable Student Behavior. Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct.

The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit **UNT's Code of Student Conduct (https://deanofstudents.unt.edu/conduct)** to learn more.

Generative AI. Presently available Generative AI tools such as ChatGPT are inconsistent and unreliable. Students in this course are not equipped to evaluate the quality of AI output regarding the course material. Rather than getting study help from AI, students are strongly encouraged to take advantage of the instructor's office hours and the **Math Lab** (described above).

Academic integrity. According to **UNT Policy 06.003, Student Academic Integrity, (https://policy.unt.edu/policy/06-003)** academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

Disability Accommodations. The University of North Texas makes reasonable accommodation for students with disabilities. Students needing a reasonable academic accommodations must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the student will request their letter of accommodation. ODA will provide faculty with a reasonable accommodation letter via email to begin a private discussion regarding a student's specific needs in a course. Students may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to meet with faculty regarding their accommodations during office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the

student. For additional information, refer to the **Office of Disability Access website. (https://studentaffairs.unt.edu/office-disability-access/index.html)**

Campus closures. The University calendar is subject to change, and campus closures may occur for a number of reasons. Students will be notified by Eagle Alert if there is a campus closing that will impact class. See the **Campus Closures Policy (https://policy.unt.edu/policy/15-006)** . for more information

Learning Objectives

Upon successful completion of this course, students will be able to:

1. Explain the difference between an ordinary differential equation (ODE) and a partial differential equation (PDE).
2. Determine the order of a differential equation.
3. Verify that a function does (or does not) solve a differential equation.
4. Use the general solution of an ODE to solve an associated initial value problem (IVP).
5. Determine whether a differential equation is linear or non-linear.
6. Determine whether a differential equation is homogeneous or non-homogeneous.
7. Draw the direction field associated to a first order differential equation, and use it to sketch the solution of an initial value problem.
8. Solve separable differential equations and determine the interval on which such a solution is valid.
9. Use integrating factors to solve first order linear differential equations, including those that can only be written using definite integrals.
0. Set up and solve applied modeling problems involving first order differential equations.
1. Apply the existence and uniqueness theorems to determine if a unique solution to a first or second order linear ODE/IVP is guaranteed to exist, and understand what it means for the theorems to not apply.
2. Compute the characteristic equation of a second order linear, constant-

coefficient, homogeneous differential equation, and use it to find a general solution, as well as solve initial value problems of this type. This includes real and distinct roots, complex roots, and repeated roots.
3. Evaluate the Laplace transform of elementary functions.
4. Use a table to compute inverse Laplace transforms.
5. Use Laplace transforms to solve linear ODEs and IVPs.
6. Analyze physical problems involving damped and undamped motion, including mechanical and electrical vibrations, generating and solving equations of this type.
7. Properly utilize terminology around mechanical and electrical motion, including “transient”, “steady-state solution”, “underdamped”, “overdamped”, “critically damped”.
8. Perform basic operations on matrices.
9. Find eigenvalues and eigenvectors of small (2x2) matrices.
10. Verify that a set of vector functions solves a given system of differential equations.
11. Write a linear system of equation in matrix notation and use this to solve linear systems of equations, or determine that the system has no solution.
12. Find the general solution and solve initial value problems for linear, constant coefficient homogeneous systems of differential equations (2x2).
13. Use Taylor series to solve a linear, second-order differential equation near an ordinary point.
14. Use Euler’s method to numerically approximate the solution to a differential equation.

Tentative Schedule

Below is the approximate timeline of when we will cover each learning objective listed above.

Week	Monday	Tuesday	Wednesday	Thursday
6/22	Review Calculus, 1, 2, 3, 4	4, 5, 6, 7	7, 8	8, 9

Week	Monday	Tuesday	Wednesday	Thursday
6/29	9, 10	10, 11	Exam 1	12, 13
7/6	13, 14, 15	14, 15, 16	16, 17	18, 19
7/13	18, 19, 20	20, 21, 22	21, 22	Exam 2
7/20	23	24	Special Topic - chosen by class	Review