Differential Equations
MAT 3324
Fall 2024

Instructor:	Dr. Matt Dallas
Office:	Haggerty Science Center 51
E-mail:	mdallas@udallas.edu

Office Hours:	Haggerty Science Center 51
Drop in:	MW 9:00 - 10:00 AM TR 3:30 - 4:30 PM
Appointment:	WF 2:00 - 3:00 PM (schedule here) WF 3:00 - 4:00 PM

Class Meeting Times:

TR 12:30 PM - 1:50 PM Haggerty Science Center 101

Prerequisites

Mathematics 1411 or consent of instructor.

Course Description and Objectives

Differential equations arise in nearly every field of science. If math is the language of the sciences, differential equations form the common dialect. The majority of the course will focus on solution techniques for common differential equations, and how to interpret these solutions in a variety of contexts. We will also see how these common equations arise from modeling certain physical phenomena.

Required Materials

We will make use of a free online textbook available here. You may purchase a physical copy if you want, but this is not required.

Grading

Lecture Quizzes: 15%

Homework: 30%

Exams: 30%

Final Exam: 25%

Lecture Quizzes

Lecture Quizzes, abbreviated LQ, will be assigned on Brightspace after each class meeting. These are short quizzes designed to test your comprehension of the material covered that day. You are allowed two attempts per LQ. **Please (please please) complete these on your own**. Scores on LQs tell me how well the class has comprehended recent material, and allows me to adjust the next lecture as necessary if scores are low. This strategy only works if the scores accurately reflect your comprehension at the time of taking the quiz. Late work will **not** be accepted, but your lowest **two** LQ grades will be dropped.

Homework

Homework, abbreviated HW, will be assigned weekly. Most of the problems will be graded for completion, and the remainder will be graded for accuracy. Even if a particular problem will be graded for completion, you should make sure you understand how to solve it. Any type of question that appears on the homework could appear on an exam. You are encouraged to discuss homework problems with your classmates, but **the work you submit must be your own.** Late work will **not** be accepted. For more details see *Homework Policy* on Brightspace.

Exams

Exams will be held during class. **Tentative** exam dates are as follows:

Exam 1: Tuesday, September 24

Exam 2: Thursday, October 17

Exam 3: Thursday, November 7

Final

The final will be held on Monday, December 16 from 11:00 AM to 1:00 PM in Haggerty Science Center 101 (our regular room). The final will be cumulative, but will emphasize the material not covered in Exams 1-3.

Attendance

You are expected to attend class. After three unexcused absences you will receive a warning letter from the Registrar. Additional unexcused absences can result in mandatory withdrawal from the course. Visit Class Attendance Policy for information regarding absences due to athletic and University-sponsored events. If you are attending a University-sponsored event that will cause you to miss an exam, you must let me know **at least two weeks in advance.**

Academic Dishonesty

The University's policy on academic honesty may be found here. In this course, you are welcome to work on homework problems with your peers, but the work you submit must be your own. There are three in-term exams and one cumulative final. If you cannot solve the homework problems or lecture quizzes on your own, then it will be very difficult to do well on the exams and therefore in the course.

The use of **Generative AI is strongly discouraged**. A generative AI such as ChatGPT is not an expert in mathematics, or any other field, and can produce inaccurate, misleading, or outright incorrect results. If you run into difficulties with a problem, you should post a question in the discussion board, ask your friends, or ask me.

Accommodations

Students with a qualifying disability may request accommodations here. You must provide me with a letter of accommodation no later than the fourth day of class. You must also schedule a meeting with me within a week of submitting your letter to discuss those accommodations that are mutually acceptable. **Accommodations will not be granted without an accommodation letter.**

Important Fall 2024 Academic Dates and Deadlines

Classes Begin	Wednesday, August 28
Labor day break	Monday, September 2
Last day to Add/drop	September 6
Charity Week	October 27 - November 2
Last day to withdraw	November 12
Thanksgiving Break	November 25 - December 1
Classes end	Wednesday, December 11

Note: Information in this syllabus is subject to change. Any changes will be clearly announced in class and through e-mail.

Tenative course calendar on next page.

Tentative Schedule

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	August 26	August 27	August 28 Classes begin	August 29 0.2 - Introduction to Diff Eqs	August 30
Due					LQ1
2	September 2 Labor Day Break	September 3 1.1 & 1.2 - Integrals as Solutions & Slope Fields	September 4	September 5 1.3 - Separable Equations	September 6
Due		HW1	LQ2		LQ3
3	September 9	September 10 1.4 - Linear Equations & Integrating Factor	September 11	September 12 1.8 - Exact Equations Part 1	September 13
Due		HW2	LQ4		LQ5
4	September 16	September 17 1.8 - Exact Equations Part 2	September 18	September 19 1.7 - Numerical Methods: Euler's Method	September 20
Due		HW3	LQ6	HW4	LQ7
5	September 23	September 24 **Exam 1**	September 25	September 26 2.1 - 2nd Order Linear ODEs	September 27
Due					LQ8
6	September 30	October 1 2.2 - Constant Coefficient 2nd order ODEs	October 2	October 3 2.4 - Mechanical Vibrations	October 4
Due		HW5	LQ9		LQ10
7	October 7	October 8 2.5 - Nonhomogeneous Equations: Undetermined Coefficients	October 9	October 10 2.5 - Nonhomogeneous Equations: Variation of Parameters	October 11 Reading Day
Due		HW6	LQ11		LQ12
8	October 14	October 15 2nd Order ODEs Review	October 16	October 17 7.1 - Power Series	October 18
Due		HW7			LQ13

Week	Monday	Tuesday	Wednesday	Thursday	Friday
9	October 21	October 22 **Exam 2 (2nd Order ODEs)**	October 23	October 24 7.2 - Power Series Solutions	October 25
Due					LQ15
10	October 28	October 29 7.3 - Singular Points	October 30	October 31 Charity Week	November 1
Due		HW8	LQ16		
11	November 4	November 5 7.3 - Method of Frobenius	November 6	November 7 Chapter 7 Practice Day	November 8
Due		HW9			
12	November 11	November 12 3.1 - Introduction to Systems	November 13	November 14 **Exam 3 (power series solutions)**	November 15
Due			LQ17		LQ18
13	November 18	November 19 3.2 - Matrices & Linear Systems	November 20	November 21 3.3/3.4 - Linear Systems of ODEs & Eigenvalues	November 22
Due		HW10	LQ18		LQ19
14	November 25 Thanksgiving Break	November 26 Thanksgiving Break	November 27 Thanksgiving Break	November 28 Thanksgiving Break	November 29 Thanksgiving Break
Due					
15	December 2	December 3 3.4 - Eigenvalue method	December 4	December 5 3.8 - Matrix Exponentiation	December 6
Due			LQ20	HW11	LQ21
16	December 9	December 10 The Laplace Transform	December 11 Classes End	December 12	December 13
Due			HW12 & LQ22		

Final Exam is Monday, December 16 11:00 AM - 1:00 PM in Haggerty Science Center 101