MATH 3350 Higher Mathematics for Engineers & Scientists

Section 1220 - Spring 2025

Class Information

Meetings: Tuesday, Thursday 2PM-3:20PM
Expectations: watch lectures before class in order to be prepared for in-class activities
Location: MATH 016 (basement)

Learning Objectives

We will learn about differential equations, their solutions, and applications to physical sciences and engineering. After this class, you should be able to:

- recognise a differential equation and its solutions
- compute solutions to first-order differential equations
- compute solutions of higher order differential equations
- use Laplace transforms
- use power series to solve linear differential equations

Instructor

Dr. Amanda N. Laubmeier
Contact: amanda.laubmeier@ttu.edu, but I will not do/check homework
Office hours: Mondays and Fridays 9:30-10:00AM, 1:30-2:00PM in Math 117B
Monday recordings (by request), posted to youtube around 6PM

Textbook and Required Material

Lecture notes are posted to Blackboard/youtube. Corresponding sections from TTU's required textbook (Elementary Differential Equations, Boyce) are noted in the schedule. You can also read Paul's Online Math Notes for additional help throughout the course.

Homework is assigned through a free online service (webwork). The website is https://webwork.math.ttu.edu/webwork2/spr25alaubmeim3350s025/. You will access webwork through your TTU eraider (SSO), just like blackboard.

Class Inclusion

Your success in this class is important to me. To accommodate circumstances that may affect your performance and attendance in this class, I offer makeup exams and have easy forms to fill out for absences or late homework credit. Please *proactively* contact me if we need to discuss any situations that are not addressed by these policies.

Groupwork and in-class discussion are an important feature of this course. We are all responsible for creating an environment where everyone feels welcome and respected when they share ideas. The norms for our classroom will be discussed on the first day of class. We will implement team contracts for group projects to ensure equal contribution.

Regular class week

This class is taught using a flipped format, which means you will watch lecture videos in advance of class and get help with homework problems during class meetings.

Tuesdays and Thursdays: New videos are due during these class periods. The schedule with video links is on Blackboard. Preparation assignments are due at the start of class, following steps from the lecture videos, and then we work on homework.

Mondays: Homework is due at midnight, with office hours for last minute questions. A forum opens from 9AM-5PM to post questions if you cannot attend office hours. At 5PM, I record "virtual office hours" to answer forum questions and post the video to youtube.

Fridays: Group projects are due at midnight on Friday, once per exam. I also hold office hours for anyone who prefers to start their homework earlier than the due date.

Grades

60% Exams (3 exams worth 20% each)

- Exams will be in-person, during class. Alternate testing times are not available.
- You will not receive your graded exam until the end of semester, but after each exam, you will receive a list of question topics and your score for each question.
- Mid-semester and during our final exam time, we will have makeup exams. You can replace any exam questions for full credit during these makeup exams.

15% Homework

- Assigned via webwork, with deadlines every Monday at midnight
- We will work on webwork in class. You can also ask questions in office hours
- If you earn above 90% on a homework assignment, you will get all the points
- To submit late work, use this form: https://forms.office.com/r/Kp90X9Z7n0

15% Daily Preparation

- Practice problems assigned via webwork, due with each new section of notes
- Steps will directly follow a problem from lecture videos (indicated by a star)
- Deadline is 30min into each class (you should arrive prepared to work on them)

10% Group Projects

- One project assigned for each exam, completed in groups of ~5
- Projects are due after three weeks, with deadlines on Friday at midnight
- If you complete all 3 projects, I will drop the lowest grade

Bonus Opportunities

- 2% extra credit: attend *and participate* in 22/26 non-exam classes
    - To submit an excused absence: https://forms.office.com/r/FeKu8Zh1R1
- 0.5% extra credit: prepare a presentation to help peers study for final
- 0.5% extra credit: possible additional opportunities TBA by April 1.

Maximum Letter Grade Cutoffs

A (90.0%), B (80.0%), C (70.0%), D (60.0%). Grades will not be rounded.
Individual exceptions to the grading scheme are not permitted.

Dates	Videos due	Topic (Textbook section)	Important dates
Jan. 16	worksheet	ODE basics (1.3, 2.8)	
Jan. 21 Jan. 23	1 2	ODE Behavior Numerical Approximations	Project 1 assigned
Jan. 28 Jan. 30	3 4	Separable ODEs Linear ODEs	Drop deadline Jan. 31
Feb. 4 Feb. 6	5	Exact Equations Extra review day	**Project 1 due Feb. 7**
Feb. 11 Feb. 13	 worksheet	**Exam 1** Spring/Mass systems	 Project 2 assigned
Feb. 18 Feb. 20	6 7	Linear Equations Homog. Const. Coeff.	
Feb. 25 Feb. 27	8 9	Reduction of Order Undetermined Coeff.	
Mar. 4 Mar. 6	10	Variation of Parameters Extra review day	**Project 2 due Mar. 7**
Mar. 11 Mar. 13		**Exam 2** ***Optional:* Exam Makeup Day**	
Mar. 25 Mar. 27	slides worksheet	Intro to Project 3 Laplace Transform (6.1-6.2)	Project 3 assigned
Apr. 1 Apr. 3	12 13	Inverse Laplace (6.1-6.2) Translation (6.3-6.4)	
Apr. 8 Apr. 10	14 15	Operations (6.6) Dirac Delta (6.5)	
Apr. 15 Apr. 17	 16	Extra review day Series Basics	 **Project 3 due Apr. 18**
Apr. 22 Apr. 24	17	Series Solutions (5.2-5.3) Extra review day	Apr. 21 holiday - HW due Apr. 22 Final drop date Apr. 22
Apr. 29 May. 1		**Exam 3** Final Presentations	
May. 6 **May 10**		Final Presentations ***Optional:* Exam Makeup Day**	 **Saturday 1:30PM-4:00PM**

TTU POLICIES AND STATEMENTS

Grading disputes: Please contact your instructor first to discuss any grading disputes. If you cannot reach your instructor, contact Brock Williams (brock.williams@ttu.edu).

ADA/SDS POLICIES: Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in Weeks Hall or call 806-742-2405.

ACADEMIC INTEGRITY: Academic integrity is taking responsibility for one's own class and/or course work, being individually accountable, and demonstrating intellectual honesty and ethical behavior. Academic integrity is a personal choice to abide by the standards of intellectual honesty and responsibility. Because education is a shared effort to achieve learning through the exchange of ideas, students, faculty, and staff have the collective responsibility to build mutual trust and respect. Ethical behavior and independent thought are essential for the highest level of academic achievement, which then must be measured. Academic achievement includes scholarship, teaching, and learning, all of which are shared endeavors. Grades are a device used to quantify the successful accumulation of knowledge through learning. Adhering to the standards of academic integrity ensures grades are earned honestly. Academic integrity is the foundation upon which students, faculty, and staff build their educational and professional careers. [Texas Tech University ("University") Quality Enhancement Plan, Academic Integrity Task Force, 2010].

PLAGIARISM: Texas Tech University expects students to "understand the principles of academic integrity and abide by them in all class and/or course work at the University" (OP 34.12.5). Plagiarism is a form of academic misconduct that involves (1) the representation of words, ideas, illustrations, structure, computer code, other expression, or media of another as one's own and/or failing to properly cite direct, paraphrased, or summarized materials; or (2) self-plagiarism, which involves the submission of the same academic work more than once without the prior permission of the instructor and/or failure to correctly cite previous work written by the same student. This video, retrieved from the University of Kansas Libraries website, provides an example of a plagiarism definition as well as examples of plagiarism and how to avoid it. Please review Section B of the TTU Student Handbook for more information related to other forms of academic misconduct, and contact your instructor if you have questions about plagiarism or other academic concerns in your courses. To learn more about the importance of academic integrity and practical tips for avoiding plagiarism, explore the resources provided by the TTU Library and the School of Law. Importantly, **AI TOOLS PROHIBITED**: The use of generative AI tools (such as ChatGPT) is strictly prohibited in this course for any purpose. Information gathered from AI cannot be used even with appropriate citation. Submission of

AI-generated content (i.e., information, text, or images) as your own work is a violation of academic integrity and may result in referral to the Office of Student Conduct. Please contact your instructor if you have questions regarding this course policy.

RELIGIOUS HOLY DAYS: "Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code §11.20. A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. A student who is excused under section 2 may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

ACCOMMODATION FOR PREGNANT STUDENTS: To support the academic success of pregnant and parenting students and students with pregnancy related conditions, the University offers reasonable modifications based on the student's particular needs. Any student who is pregnant or parenting a child up to age 18 or has conditions related to pregnancy may contact Alex Faris, the Texas Tech University designated Pregnancy and Parenting Liaison, to discuss support available through the University. The Liaison can be reached by emailing alfaris@ttu.edu. Should a student communicate with the instructor that they are pregnant or have a pregnancy related condition or may need additional resources related to pregnancy or parenting, the instructor will communicate that student's information to the Title IX Coordinator, who will work with the student and others, as needed, to ensure equal access to the University's education program or activity. For more information regarding supportive measures, please contact pregnancy & parenting liaison Alex Faris (alfaris@ttu.edu | 806.834.3420) or visit https://www.depts.ttu.edu/titleix/PregnacnyandParenting/index.php. You can also visit https://www.depts.ttu.edu/titleix/PregnacnyandParenting/index.php to submit a request to Alex Faris for assistance.

DISCRIMINATION, HARASSMENT, AND SEXUAL VIOLENCE: Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination of any kind. Sexual assault, discrimination, harassment, and other Title IX violations are not tolerated by the University. Report any incidents to the Office for Student Rights & Resolution, (806)-742-SAFE (7233) or file a report online at titleix.ttu.edu/students. Faculty and staff members at TTU are committed to connecting you to resources on campus. Some of these available resources are: TTU Student Counseling Center, 806- 742-3674, https://www.depts.ttu.edu/scc/(Provides confidential support on campus.) TTU 24-hour Crisis Helpline, 806-742-5555, (Assists students who are experiencing a mental health or interpersonal violence crisis. If you call the helpline, you will speak with a mental health counselor.) Voice of Hope Lubbock Rape Crisis Center, 806-763-7273, voiceofhopelubbock.org (24-hour hotline that provides support for survivors of sexual violence.) The Risk, Intervention, Safety and Education (RISE) Office, 806-742-2110, https://www.depts.ttu.edu/rise/ (Provides a

range of resources and support options focused on prevention education and student wellness.) Texas Tech Police Department, 806-742- 3931, http://www.depts.ttu.edu/ttpd/ (To report criminal activity that occurs on or near Texas Tech campus.)

RECOVERY SERVICES: The Center for Students in Addiction Recovery offers students in recovery a nurturing and supportive community. The Center provides students in recovery with an abstinence-based program where students can flourish in recovery as they attain educational goals, including advanced degrees. The services provided through the CSAR increases the continuum of care for students in recovery, enhancing the quality of life for students in recovery at Texas Tech University. The CSAR supports students in recovery from alcohol, drugs, and behavioral addictions. By providing recovery support through relationships with staff, academic advising, scholarships / fellowships, recovery housing, study abroad opportunities, and more, students can flourish in recovery and in life.

CIVILITY IN THE CLASSROOM: Texas Tech University is a community of faculty, students, and staff that enjoys an expectation of cooperation, professionalism, and civility during the conduct of all forms of university business, including the conduct of student–student and student–faculty interactions in and out of the classroom. Further, the classroom is a setting in which an exchange of ideas and creative thinking should be encouraged and where intellectual growth and development are fostered. Students who disrupt this classroom mission by rude, sarcastic, threatening, abusive or obscene language and/or behavior will be subject to appropriate sanctions according to university policy. Likewise, faculty members are expected to maintain the highest standards of professionalism in all interactions with all constituents of the university (www.depts.ttu.edu/ethics/matadorchallenge/ethicalprinciples.php).

FOOD INSECURITY: Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. Raider Red's Food Pantry (located in Doak 117) supplies personal care items and a selection of nonperishable food to students. The Raider Relief Advocacy and Resource Center (RR- ARC) is a centralized hub of resources and support for students facing hardships with their basic needs. Through a comprehensive network of campus and community partnerships, we strive to alleviate the burden of financial, physical, and emotional hardships and promote the well-being and academic success of all students. Please fill out our form to get connected: https://www.depts.ttu.edu/raiderrelief/.

STUDENT SUPPORT: I stand firm in my support of all students at Texas Tech University and my commitment to educating and empowering a diverse student body. If you’re not sure of where or how to find resources to support your success here at TTU, please don’t hesitate to reach out to me. The Office of Campus Access and Engagement works across Texas Tech University to foster, affirm, celebrate, engage, and strengthen all student communities. For more information about services, opportunities for participation, and ways in which Texas Tech can support your success in college, please contact (806) 742-7025.