THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
DEPARTMENT OF MATHEMATICAL SCIENCES

Math 2326: Differential Equations (ONLINE)
CRN: 12170
Fall 2024

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Office Hours: Virtually: WF 3:30pm-5:00pm, follow the link below, that is also posted in Blackboard:

https://utep-edu.zoom.us/j/81982096430?pwd=Er5bVmacek3cl30kgtbMu0OgBHSmLL.1

Student office hours are a time where you can get individualized help from me. I am available to answer questions about course content and address any concerns you have about the class. During scheduled times, you may drop in without an appointment. You are not required to attend the sessions if you do not have questions. If you do need help, and cannot attend during the scheduled time, please email me to schedule an appointment.
Office hours are only held during normal university scheduling. Please allow one business day for the return of emails. Evening and weekend emails will be attended to during regular business hours.
During off-scheduling (Finals week) or condensed scheduling (late start, closed university) hours will be adjusted appropriately.

COURSE DESCRIPTION

The primary goal of Math 2326 is to prepare students for solving problems involving ordinary differential equations, and application of techniques to different disciplines.

Prerequisite Courses: C or better in Math 1312.

OUTCOMES

Students will have a clear understanding of the following concepts and techniques: Methodologies and techniques for finding solutions to ordinary differential equations in the context of dynamical systems; modeling, separation of variables, qualitative and numerical methods, equilibria and bifurcations, linear systems, driven oscillations, real and complex solutions. Nonlinear systems and Laplace transform.

REQUIRED TECHNOLOGY - MATERIALS

Required Textbook: Blanchard, Devaney and Hall, Differential Equations 4th edition.
ISBN-13: 978-1133109037

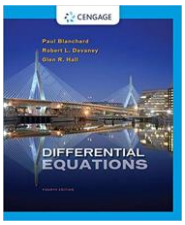

Image: Textbook cover

Strongly Recommended: Differential equations by Paul Dawkins (Paul's Notes – LAMAR)

Strongly recommended: TI-83 or TI-89 Calculator

TECHNOLOGY REQUIREMENTS

Course content is delivered via the Internet through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You will need to have access to a computer/laptop, scanner and a microphone. You will need to download or update the following software: Microsoft Office, Adobe Acrobat Reader, Windows Media Player, QuickTime, and Java. Check that your computer hardware and software are up-to-date and able to access all parts of the course.

If you do not have a word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about Microsoft Office 365 and follow the instructions.

IMPORTANT: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP Help Desk as they are trained specifically in assisting with technological needs of students. Please do not contact me for this type of assistance. The Help Desk is much better equipped than I am to assist you!

COURSE ASSIGNMENTS AND GRADING

Assignments for this course:

All work, including homework, quizzes, and exams, will take place through Blackboard. Blackboard will be our primary platform. Inside of the Blackboard course you will be able to see announcements, grades, and course materials.
You will have video access through Blackboard. Other course resources will be found in Blackboard.

Two midterm exams, a comprehensive final exam, quizzes and homeworks will be given. **If it benefits you, the score you receive on the final exam will replace your lowest exam score.**

The exams are timed, at three hours each. The exams will be available for a 24-hour period on the date specified. The exam password for exams 1 and 2 is the word: **ready**

You will have a comprehensive final exam. This exam will be available for a 24-hour period according to the class calendar. Your final exam will have a time limit of five hours and the password is the word: **ready**.
For all timed assignments, the clock begins once you type the password and it will not stop, even if you log out. Therefore you must check for any updates on your computer prior to beginning the timed assignments.

A comprehensive course schedule is attached to this syllabus. Semester highlights are included below:

- August 26 First Day of Classes
- September 11 Census Day (Last day to drop without a W)
- November 1 Drop Day (Last day to drop with a W)
- November 28-29 Thanksgiving Holiday (University closed)
- December 5 Last Day of Class Meetings
- December 9 - 13 Final Exam WeekWeek

Grading Policy: You will be graded on homework, quizzes, exams, and a final exam

10% Homework
15% Quizzes
20% Exam I
20% Exam II
35% Final Exam

Letter grades are determined according to the following scale:

Grade	**Score**
A	90-100
B	80-89
C	70-79
D	60-69
F	<60

Course Communication: How we will stay in contact with each other

Because this is an online class, we won't see each other in the ways you may be accustomed to: during class time, small group meetings, and office hours. However, there are a number of ways we can keep the communication channels open:

Office Hours: We will not be able to meet on campus, but I will still have office hours for your questions and comments about the course. My office hours will be held virtually using this link:

https://utep-edu.zoom.us/j/81982096430?pwd=Er5bVmacek3cl30kgtbMu0OgBHSmLL.1

and during the following times:

Wednesdays: 3:30-5:00 p.m. Mountain Time
Fridays: 3:30-5:00 p.m. Mountain Time

- **Email**: UTEP e-mail is the best way to contact me. I will make every attempt to respond to your e-mail within 24-48 hours of receipt. When e-mailing me, be sure to email from your UTEP student account and please put the course number in the subject line. In the body of your e-mail, clearly state your question. At the end of your e-mail, be sure to put your first and last name, and your university identification number.
- **Announcements**: Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

NETIQUETTE

As we know, sometimes communication online can be challenging. It's possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep these netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action.

- Always consider audience. This is a college-level course; therefore, all communication should reflect polite consideration of other's ideas.

- Respect and courtesy must be provided to classmates, the TAs, and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.

Course Policies: What do you need to do to be successful in the course

ATTENDANCE AND PARTICIPATION

Attendance in the course is determined by participation in the learning activities of the course. Your participation in the course is important not only for your learning and success but also to create a community of learners. Participation is determined by completion of the following activities:

- Reading/Viewing all course materials to ensure understanding of assignment requirements
- Participating in scheduled Blackboard Collaborate sessions
- Other activities as indicated in the calendar and schedule

Because these activities are designed to contribute to your learning each week, they cannot be made up after their due date has passed.

COURSE DROP POLICY

The Drop Date for this semester is Friday, November 1rd, 2024, before 5:00 PM Mountain Time. No drops will be approved after this date or time by the College of Science.
If you are failing the course I will contact you to discuss your situation before processing a drop form.

Students who decide to drop the course must process a drop form, by sending an email from your official UTEP email account to records@utep.edu by November 1rd 2024, before 5:00 PM MDT. When you email, be sure to do so from your miners email account and include your full name, student ID number, and full class details such as the course name, number, and CRN.

DEADLINES, LATE WORK, AND ABSENCE POLICY

Homework:

- No late work will be accepted if the reason is not considered excusable.

Quizzes:

- All quiz assignments will be due on Wednesdays at midnight (11:59 PM). No late work will be accepted if the reason is not considered excusable.

Exams:

- The two exams and the final exam will be due on Thursdays at midnight (11:59 PM). No late work will be accepted if the reason is not considered excusable.

MAKE-UP WORK

Make-up work will be given *only* in the case of a *documented* emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

ALTERNATIVE MEANS OF SUBMITTING WORK IN CASE OF TECHNICAL ISSUES

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you save all your work (homeworks, quizzes, and exams) in a separate Word or PDF document as a back-up. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your back-up document as a last resort.

INCOMPLETE GRADE POLICY

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the CASS portal.

SCHOLASTIC INTEGRITY

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) for possible disciplinary action. To learn more, please visit HOOP: Student Conduct and Discipline.

COPYRIGHT STATEMENT FOR COURSE MATERIALS

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.

Course Resources: Where you can go for assistance

UTEP provides a variety of student services and support:

Technology Resources

- Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

Academic Resources

- UTEP Library: Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- University Writing Center (UWC): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- Math Tutoring Center (MaRCS): Ask a tutor for help and explore other available math resources.

Individual Resources

- Military Student Success Center: Assists personnel in any branch of service to reach their educational goals.
- Center for Accommodations and Support Services: Assists students with ADA-related accommodations for coursework, housing, and internships.
- Counseling and Psychological Services: Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

I hope this will help to get you started in the course. You should be able to start working on the assignments beginning Monday, August 26th. Please log in on August 26th and get started on the course.
Please let me know if you have any questions. Good luck in the course!

Dr. Maria Pia Beccar Varela

Weekly Calendar (Subject to Change)

This calendar provides an overview of the course. More details are available in Blackboard. The due date for Quizzes is ALWAYS Wednesday at 11:59 PM (MST), the due date for the 2 Midterm Exams and the Final Exam is ALWAYS Thursday at 11:59 PM, the final exam is due on Thursday, December 12th. The quizzes are available from the beginning of the semester. The password for the exams is the word: ready. No late work will be accepted. The midterm exams will display 24 hours prior to the due day and time, and the final will display 24 hours prior to the due day and time. Your final exam will have a time limit of five hours and the password is the word: ready

All readings and Homework problems are in the textbook Blanchard and Devaney 4th edition, with the exception of HW problems for Sections 6.4 (Euler equations), 3.9 (Undetermined coefficients) and 3.10 (Variations of parameters) in Differential equations by Paul Dawkins, that are posted.

	Topics	Readings Due	Assignments Due	Notes
Week 1 8/26-8/30	Syllabus discussion Review basic concepts from Calculus 2, define a differential equation, and differential equations of order 1. Modeling.	Read syllabus, Section 1.1 (Modeling via differential equations)	*HW for Section 1.1 - Problems: 1, 3, 4, 5, 6, 7 due on August 29, 2024	**August 26 is the first day of classes**
Week 2 9/2-9/6	Differential equations of order 1, continuation. Separation of variables, linear equations	Sections 1.2 and 1.8	*HW for Section 1.2 - Problems: 1, 2, 5, 17, 19, 20, 21, 27, 32, 33, 34, 37, 39 due on September 2, 2024 *HW for Section 1.8 - Problems: 3, 4, 9, 10, 11, 12, 13, 20, 22, 32 due on September 6, 2024	
Week 3 9/9-9/13	Integrating factors for linear equations	Section 1.9	*HW for Section 1.9 - Problems: 1, 3, 4, 5, 7, 10, 12, 13, 15, 16, 19, 22, 25 due on September 12, 2024	**September 11 Census day (last day to drop without a W)**

Week 4 9/16-9/20	Additional analytic methods for special systems	Section 2.4	* HW for *Section 2.4 - Problems: 1, 2, 3, 4 due on September 17, 2024* ***Quiz I, due on *September 18, 2024* (separation of variables-linear equations)**	
Week 5 9/23-9/27	Properties of linear systems and the linearity principle	Section 3.1, 3.2	* HW for Section 3.1 - Problems: 5, 7, 9, 10, 11, 13, 15, 16, 25 due on September 23, 2024	
Week 6 9/30-10/4	Straight-line solutions Second order linear equations	Sections 3.2, 3.6	*HW for Section 3.2 - Problems: 1, 2, 3, 6, 7, 9, 10, 11, 13, 15, 17, 19 due on September 30, 2024 *HW for Section 3.6 - Problems: 1, 3, 7, 10, 11 due on October 4, 2024	
Week 7 10/7-10/11	Undetermined coefficients and Variations of parameters	Sections 3.9, 3.10 in Differential equations by Paul Dawkins	*HW problems for these two sections are posted in Blackboard, due on October 11, 2024	
Week 8 10/14-10/18	Euler equations	Section 6.4 in Differential equations by Paul Dawkins	* HW problems for this section are posted in Blackboard, due on October 16, 2024	

Week 9 10/21-10/25	Phase portraits for linear systems Review Exam 1	Section 3.3	*HW for Section 3.3 - Problems: 1, 4, 7, 9, 13 19 due on October 21 ***Quiz 2 due on October 23 (first order and second order linear equations and linear systems)** ***Exam 1 due on October 24**	
Week 10 10/28-11/1	complex eigenvalues Optional: special cases, repeated and zero eigenvalues	Section 3.4 Optional-Extra points: Section 3.5	*HW for Section 3.4 - Problems: 1, 3, 6, 9, 10, 13 due on October 25, 2024 *HW for Section 3.5 - Problems: 1, 5, 9 due on October 29, 2024	**November 1 Last W, last day to drop with a W**
Week 11 11/4-11/8	Laplace Transform	Sections 6.1, 6.3	*HW for Section 6.1 - Problems: 5, 7, 8, 9, 13, 15, 25 due on November 2, 2024	
Week 12 11/11-11/15	Second Order Equations using Laplace Optional: Convolution	Section 6.3 Optional-Extra points: Section 6.5	*HW for Section 6.3 - Problems: 3, 5, 7, 11, 17, 27, 29 due on November 9, 2024 * HW for Section 6.5 - Problems: 1, 2, 3, 4, 5 due on November 12, 2024 HW for Section 5.1 - Problems: 1, 3, 7, 9, 11, 15 due on November 17, 2024	

Week 13 11/18-11/22	Nonlinear Systems	Section 5.1	***Quiz 3 due on November 20 (Lapplace transform and nonlinear systems)**	
Week 14 11/25-11/30	Hamiltonian systems	Section 5.3	*HW for Section 5.3 - Problems: 1, 2, 3, 11, 14, 15, 17 due on December 2, 2024. ***Exam 2 due on November 28**	Thanksgiving Holiday: November 28-29
Week 15 12/2-12/6	Last week of classes	Review Final Exam	***Quiz 4 due on 12/4 Hamiltonian systems**	December 5 Last Day of Class Meetings
Week 16 12/9-12/13	Finals week	Final Exam	***Final Exam due on December 12**	**December 9 - 13** **Final Exam Week**