

THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
DEPARTMENT OF MATH

Course #: Math 2326 (CRN: 20726)
Course Title: Differential Equations
Credit Hrs: 3
Term: Spring 2023
Course Meetings & Location: TR 12:00pm – 1:20pm LART 103
Prerequisite Courses: Math 1312 with a grade of at least C.

Instructor: Francisco Avila
Office Location: Library 521
Contact Info: 747-8752
E-mail address: favila2@utep.edu
Emergency Contact: (915)747-5761 (Math Department)
Office Hrs: MW 12:30pm – 1:20pm via Zoom or by appointment

Textbook(s), Materials: Required: Blanchard, Devaney and Hall, *Differential Equations*, Fourth Edition
Required: Scientific Calculator

Course Objectives (Learning Outcomes): **Contents:** This course is devoted to the study of 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.

Objectives: To introduce topics to practice with strong emphasis on applications. The goals are to learn basic concepts, theory, methods and applications of ordinary differential equations with emphasis on modeling and dynamics.

Course Activities/Assignments: Homework and Quizzes will be assigned on **WeBWork**. **WeBWork** is an open-source online homework system for math and sciences courses. Instructions to use this platform will be posted on Blackboard. You must have reliable internet in order to use it. Unannounced quizzes may be administered in the classroom and will be based on homework problems.

Assessment of Course Objectives: There will be 2 partial exams and one comprehensive final administered in the classroom. **NO EXTRA CREDIT OR CURVES ON EXAMS. NO REPLACEMENT OF EXAM WITH FINAL EXAM.**

Grading Policy: Your grade will be calculated as follows:

Homework	10%
Quizzes	10%
Exam 1	25%
Exam 2	25%
Comprehensive Final	30%

The grading scale for this course is:

90 – 100 = A

80 – 89 = B

70 – 79 = C

60 – 69 = D

0 – 59 = F.

The Drop Date for this semester is Thursday March 30th, 2023. No drops will be approved after this date.

Make-up Policy: No makeup exams will be allowed except with proper documentation, i.e. doctor's note, hospital's note, or UTEP excused absence document.

Attendance Policy: Students must attend every class. Students are to arrive on time to class. It is the student's responsibility to find out what assignment must be made up when they are absent.

Civility Statement: Calculators may not be shared during quizzes and exams. Please do not use cell phones, pagers, iPods, MP3 players, blue tooth devices, etc. during class. Cell phones and pagers should be set to silent or vibrate, and any calls should be taken outside of class. Please do not wear headsets or blue tooth devices during class. Please don't talk in class. Cell phone calculators may not be used on quizzes or exams. Active participation in class is expected, teamwork in class will be implemented.

Video or pictures of lectures must have written consent from the instructor and student(s).

Academic Integrity Policy: The University policy is that all suspected cases or acts of alleged scholastic dishonesty must be referred to the Dean of Students for investigation and appropriate disposition. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Each student is responsible for notice of and compliance with the provisions of the Regents' Rules and Regulations, which are available for inspection electronically at <http://www.utsystem.edu/bor/rules/homepage.htm>.

All students are expected and required to obey the law, to comply with the Regents' [Rules and Regulations](#), with System and University rules, with directives issued by an administrative official in the course of his or her authorized duties, and to observe standards of conduct appropriate for the University. A student who enrolls at the University is charged with the obligation to conduct himself/herself in a manner compatible with the University's function as an educational institution.

Any student who engages in conduct that is prohibited by Regents' [Rules and Regulations](#), U. T. System or University rules, specific instructions issued by an administrative official or by federal, state, or local laws is subject to discipline, whether such conduct takes place on or off campus or whether civil or criminal penalties are also imposed for such conduct.

Military Statement: If you are a military student with the potential of being called to military service and /or training during the course of the semester, you must contact me as soon as possible **before** you leave.

Disability Statement: If a student has or suspects she/he has a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. The student is responsible for presenting to the instructor any CASS accommodation letters and instructions. For additional information, please visit the CASS website at www.utep.edu/CASS. *CASS' Staff are the only individuals who can validate and if need be, authorize accommodations for students with disabilities.*

Course Schedule:
(Subject to Change)

Day	Section	Description
1/17/23	1.1	Modeling Via Differential Equations
1/19/23	1.2	Analytic Technique: Separation of Variables
1/24/23	1.3	Qualitative Technique: Slope Fields
1/26/23	1.4	Numerical Technique: Euler's Method
1/31/23	1.5	Existence and Uniqueness of Solutions
2/2/23	1.6	Equilibria and the Phase Line
2/7/23	1.7	Bifurcations
2/9/23	1.8	Linear Equations
2/14/23	1.9	Integrating Factors for Linear Equations
2/16/23	2.1	Modeling via Systems
2/21/23	2.2	The Geometry of Systems
2/23/23	2.3	The Damped Harmonic Oscillator
2/28/23	2.4	Additional Analytic Methods for Special Systems
3/2/23	Review	
3/7/23	Exam1	
3/9/23	3.1	Properties of Linear Systems and the Linearity Principle
3/14/23		Spring Break
3/16/23		Spring Break
3/21/23	3.2	Straight-Line Solutions
3/23/23	3.3	Phase Portraits for Linear Systems with Real Eigenvalues
3/28/23	3.4	Complex Eigenvalues
3/30/23	3.5	Special Cases: Repeated and Zero Eigenvalues
4/4/23	3.6	Second-Order Linear Equations
4/6/23	3.7	The Trace-Determinant Plane
4/11/23	3.7	The Trace-Determinant Plane
4/13/23	5.1	Equilibrium Point Analysis
4/18/23	Review	
4/20/23	Exam 2	
4/25/23	5.1 – 5.2	Equilibrium Point Analysis
4/27/23	6.1	Laplace Transforms (Part I)
5/2/23	6.2	Laplace Transforms (Part II)
5/4/23	6.3	Laplace Transforms (Part III)
5/9/23	Final Exam	1:00pm – 3:45pm