

MATH 3307: Differential Equations

Sul Ross State University ~ Rio Grande College
Fall 2014

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Course Description MTH 3307 is intended as an introduction to differential equations, including first order first degree equations, linear differential equations of higher order, Laplace transforms, series solutions, systems of linear differential equations, and applications.

Course Objectives Students will investigate how differential equations originate and how to represent their solutions; practice techniques for solving first-order differential equations; explore applications of first-order differential equations; investigate higher-order differential equations; study harmonic motion; and learn the uses of the Laplace transform.

Mathematics Program Outcomes The graduating student will be able to demonstrate content knowledge in mathematics including arithmetic, algebra, geometry, probability, statistics, and calculus.

Class Time Monday & Wednesday, 4:30 – 5:45 p.m.

Class Location Del Rio 109; Eagle Pass B111; Uvalde B113c

Required Text Tenenbaum & Pollard, *Ordinary Differential Equations*, ISBN 0486649407

Office Hours Monday – Thursday, 10:00 a.m. – 12:00 p.m., or by appointment, or basically whenever I'm in my office and not too busy.

Course Policies

Attendance Policy

Attendance is mandatory. You will be held responsible for all material covered in class or in the reading assignments. If you have to miss a class, it is your responsibility to obtain all notes, assignments, and announcements from someone else in the class. Make-up exams will be given only in the event of an emergency, in which case written justification and/or documentation must be provided and approved.

Communication

I will post course documents, reminders, announcements, and assignments on the Blackboard system. I may also occasionally send announcements via e-mail. You should make sure you know how to access and use these tools. E-mail is the best way to contact me.

You are welcome to stop by my office if you need help with the homework or wish to speak

about your progress in the course. If you would like to meet with me and can't travel to Uvalde, please let me know, and we will try to arrange an appointment at your site.

I am here to help you. Ask questions in class, call me, e-mail me, or come to my office. If you don't communicate with me, then I can't help you.

Homework

Homework will be assigned for each section that we cover in the text. Although the homework will not be graded for correctness, you should regard it as the most essential component of the course. It is very important that you complete each homework assignment before the next class period. This will allow you to make the most of our time together. We will always have time in class to discuss the homework.

During the final weeks of the semester you will turn in a homework folder. This should contain every assigned homework **in order**, with **all the work shown**. Solutions with just the answers will not receive credit. These will be graded for completeness, not correctness.

The folder is due Thursday, November 20.

Grading Policy

Your grades will be weighted as follows:

Homework Folder	15%
Midterm Exam	35%
Final Exam	50%

A student who averages at least 90% will receive an A; at least 80% will receive at least a B; at least 70% will receive at least a C; at least 60% will receive at least a D.

Exams

There will one midterm exam. The tentative date is October 21. This is subject to change. You will be notified of a change at least one week in advance. Make-up exams will be given only in the event of an emergency, in which case written justification and/or documentation must be provided and approved.

Implicit in registering for this course is your agreement that you will be present to take the final exam at the time determined by the University, which is Tuesday, December 9, from 3:00 – 5:45. The final exam will be comprehensive.

Dates to Remember

October 21	tentative midterm exam
November 20	homework folder due
December 9	final exam

Subject Outline

Below is a tentative outline of the subjects we will cover in this course.

- I. Basic Concepts: *terminology – the differential equation – the general solution – direction fields*
- II. Special First-Order Differential Equations: *separable equations – homogeneous coefficients – linear coefficients – exact equations – integrating factors – linear equations of the first order – other methods*
- III. Applications of First-Order Differential Equations: *geometric problems – trajectories – dilution and accretion – motion along a straight line – pursuit curves – other problems*
- IV. Higher-Order Differential Equations: *complex numbers and complex functions – linear independence of functions – linear differential equations – homogeneous linear equations with constant coefficients – nonhomogeneous linear equations with constant coefficients – variation of parameters – reduction of order*
- V. Applications of Higher-Order Differential Equations: *harmonic motion – electric circuits – rolling and twisting bodies – bending beams.*
- VI. Operators and the Laplace Transform.

Schedule

This schedule is tentative only. The unit numbers refer to the above outline.

Unit I	August 26 – 28
Unit II	September 2 – 23
Unit III	September 25 – October 19
Midterm Exam	October 21
Unit IV	October 23 – November 6
Unit V	November 11 – 20
Thanksgiving Break	November 27
Unit VI	November 25 – December 2
Review	December 4
Final Exam	December 9

Americans With Disabilities Act

Sul Ross State University is committed to equal access in compliance with the Americans With Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Kathy Biddick, Student Services Administrative Secretary.