Advanced Ordinary Differential Equations

MATH 3373.001 | SPRING 2022

Instructor: Dr. Deborah Koslover

Office: RBN 4010

Email: dkoslover@uttyler.edu

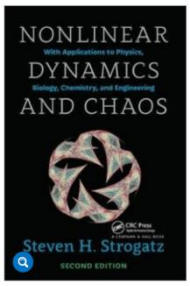
Classroom: FAC 2006

Meeting Time: MWF 10:10-11:05 AM

Office Hours: MTTh 1-1:50 PM and MW 4 – 5 PM or by appointment.

Course Description

In this course explores topics in applied mathematics as they pertain to the physical sciences. Never fear, you will not be expected to have an extensive background in the physical sciences. As we learn new mathematical techniques, we will also cover the required background material from the sciences. We will study linear and nonlinear systems, phase plane analysis, study of bifurcations, transform methods, mechanics, and chaos, with a focus on theoretical development and physical application. This course has a perquisites, MATH 3425 Foundations of Mathematics. MATH 3305 Differential Equations, and MATH 3203 Matrix Methods or MATH 3315 Linear Algebra



Textbook

Nonlinear Dynamics and Chaos, 2nd edition, by Steven H. Strogatz, Westview, 2016. ISBN-13: 978-0813349107 ISBN-10: 0813349109

Website

You will be using Canvas. Go to www.uttyler.edu/canvas to log into Canvas using your regular patriots account. If you have enrolled in the course, you should have access to the website. You will find important documents, grades, lecture notes, and announcements on Canvas.

Attendance is mandatory and attendance records will be kept. Notify Dr. Koslover in advance if you must miss a class, be late for a class or leave early. (Official University Policy: Class attendance is the responsibility of the student. When a student has a legitimate absence, the instructor may permit the student to complete missed assignments. In many cases class participation is a significant measure of performance, and non-attendance may adversely affect a student's grade. When a student's absences become excessive, the instructor may recommend that the student initiate a withdrawal.)

Learning Outcomes

At the conclusion of this course, you will be able to

1. Use phase diagrams, stability analysis and geometric thinking to solve and analyze problems arising in the physical sciences

2. Analyze a problem using bifurcation theory.

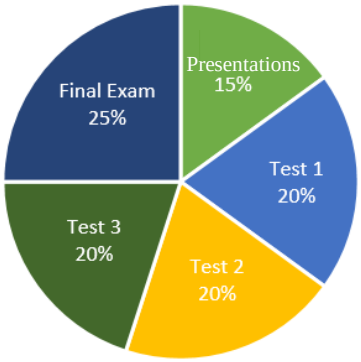
3. Piece together multiple ideas used in class to solve problems arising in the physical sciences.

Course Evaluation

At the end of the semester, you will find your final grade on my.uttyler.edu. It will also be posted on Canvas.
A final course grade of

90% is guaranteed to be at least an A
80% is guaranteed to be at least a B
70% is guaranteed to be at least a C
60% is guaranteed to be at least a D.

All grades below 60% will be F.



The Plan

Presentations (15%) Homework will be assigned daily. Assignments will appear on Canvas. Homework, in the form of presentations, will be due one week after it is assigned. Students will be asked to get up and present one or two problems. You may show your paper on the overhead projector or start from scratch and demonstrate by writing what you did. You will be graded on correctness of work, clarity of presentation and your answers to questions asked. Each student will be allowed one "pass" per class but will receive a zero on the assignment if they ask for two passes.

Students watching the presentations will be awarded points for insightful questions or comments. If you have done a problem in a significantly different fashion than the presenter, you may ask to show your solutions for credit.

Solutions will be posted on Canvas. Do not sell to Chegg or similar websites. Do not pass down to future generations of students.

TESTS

There will be three tests (20% each) and a final exam (25%). These exams will test your knowledge of the material taught in the class and practiced on the homework. Test problems will be similar to homework problems, but generally shorter. The final exam will be comprehensive, but will emphasize material in the final third of the course.

The dates and times of these exams are as follows:

- **Test 1**: Wednesday, February 12, 2020
- **Test 2**: Wednesday, March 18, 2020
- **Test 3**: Friday, April 10, 2020

FINAL EXAM

Final Exam: (Tentative) Wednesday, April 30, 2020, 10:15 AM – 12:15 PM.

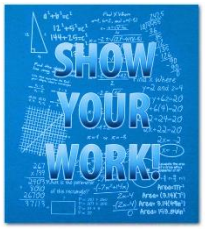
Make-ups

Make-ups for **documented** absences that are **required** as part of a UT Tyler obligation (e.g. athletes participating in an event, participating in a debate contest, etc.) or for religious observation will be granted. For all make-ups of this type, prior notification of at least one week and documentation are required. Other make-ups are granted only in extreme cases such as hospitalization and at the sole discretion of the instructor.

Make-ups will be allowed for the following excused absences.

1) Illnesses, with a doctor's note, no exceptions.
2) Your child's illness, with a doctor's note.
3) Court appearances, including citizenship court, with documentation
4) Weddings, funerals or military advancement with documentation **and** a photograph showing that you attended the event.

Other Details



Calculator Policy: Non-graphing calculators may be used on tests. You may not use your phone. However, all work must be shown.

Cell phones, IPODs and other electronic devices: Please set your cell phones and pagers to silent mode. If you are expecting an emergency call, please notify the instructor in advance, sit near the door, and answer the phone outside. You will not be allowed to wear an IPOD or other electronic devices during an exam. During tests, cell phones must be turned off and placed in sight on your desk.

Covid Related Issues

Let me know if you will be missing class, before class if possible. If we have class cancellations or if the university gets shut down, I may move test or quiz dates. I will email you and post an announcement on Canvas in these circumstances. If we get into a situation where we have to do online tests or quizzes, you will need a camera and microphone. I must be able to see your face during the exam. Your phone will work, but it will be easier for you if you can use your computer. Additionally, in this case, some quizzes or tests may be changed to projects.

If you have any special concerns, problems or other issues, please let me know as soon as possible so that we can craft solutions.

Calendar

JANUARY			FEBRUARY			MARCH			APRIL		
MON	TUE	THU	MON	TUE	THU	MON	TUE	THU	MON	TUE	THU
10	12	14	31	2	4	28	2	3	4	6	8
					Test 1						
First Day			7	9	11	7	9	11	11	13	15
17	19	21				Spring Break					
MLK Day			14	16	18	14	16	18	18	20	22
24	26	28									
Census Day			21	23	25	21	23	25	25	27	29
					Test 2				Study day	Final Exam	
						28	30	1	Final 10:15 AM – 12:15 AM		
						Drop day		Test 3			