

Mathematics 256—Introduction to Differential Equations

INSTRUCTOR: Professor Huaxin Lin

TIME: MTWF 12:00-12:50 pm, 102 Peterson Hall

TEXT BOOK: William E. Boyce and Richard C. DiPrima Elementary
Differential Equations (9th ed).

PREREQ: Math 253.

OFFICE HOURS: MTF: 3:00-4:00, 11C Deady

OFFICE PHONE: 541-346-5638.

Deadlines :

Please check Academic Calendar.

Lectures: Lectures only serve as outlines of this course. Major points of view will be presented in lectures. One should not assume that everything will be understood in class. One may only understand the material after one does the homework.

We will cover Chapter 2, Chapter 3, part of Chapter 4 and Chapter 7

Reading assignments

Week 1, 1.1-1.4 and 2.1-2.2.

Week 2, 2.3, 2.5 and 2.6.

Week 3, 2.7, 3.1, 3.2.

Week 4, 3.3, Review and Test I on Friday Oct. 21st.

Week 5, 3.4–3.6.

Week 6, 4.1–4.2, 7.1-7.2.

Week 7 , 7.3-7.5, .

Week 8, 7.6 Review and Test II .

Week 9, 7.7, 7.8.

Week 10 Further material (2.8, for example) and Review.

The above may be modified according the actual lectures and will not be any further notification. But the time for the Test I and Test II will not be changed.

Homework will be assigned in class.

Quiz There will be a quiz for most Mondays.

Test I will be on Friday, Oct. 21st.

Test II will be on Friday, Nov. 18th.

Final Exam: 10:15 am, Friday, Dec. Xth. Check the Final Schedule.

Everybody will take the exam at that time. According to faculty legislation, final exams may not be given early under any circumstances.

Final grades will be based on

20% (Homework and Quiz) + 25% TestI + 25% TestII and 30% Final

Course Goals

The first part of course consists of basically chapter 2 and 3, where first order differential equations and second order linear equations with constant coefficients are discussed. There are several mathematical modelings and applications in these two chapters. The second part consists of higher order linear equations and systems of first order linear equations. The primary goal of the course is to introduce ordinary differential equations to students, the basic modeling and standard methods to solve some simple differential equations.

This requires students understands how to use integral factors to simplify first order linear equations so that they can use integral to solve differential equations. It also requires students to know basic models related to differential equations such as exponential growth and decay, spring-mass systems, or electrical circuits. Students should also know the process to reduce second order linear differential equation problems to quadratic equation problems as well as to reduce problems of a system of linear differential equations to problems of a system of linear equations.

Students may find chapter two is technically difficult since they need to find their own ways to deal several different forms of first order differential equations instead of following a uniform formula. For students who had C in 251-253, it is even difficult to do integration. So instructors are encouraged to do things slowly when they do the last process of solving equations—integration. Lack of knowledge in linear algebra is another problem for

students since chapter 7 relies on linear algebra. General Jordan decomposition should be avoided but examples of repeated eigenvalues should be worked out. For the purpose of future study, it is good to discuss some aspects of the existence and uniqueness theorem, perhaps in the late part of the course.