

Professor: Dr. Talitha Washington

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Office Hours: By appointment only

Text: *A First Course in Differential Equations*, 8th Edition, Dennis G. Zill

Catalog Description: Math 324 Differential Equations (3) Includes standard first and second order methods, systems, difference equations, power series, Laplace transforms and numerical and nonlinear methods, with applications for all of these. Prerequisite: Mathematics 323.

Course Learning Objectives: It is expected that students will:

- gain factual knowledge about differential equations
- be able to classify as well as acquire methods to solve differential equations
- learn fundamental principles and theory of differential equations
- learn to apply course material to enhance understanding in fields of engineering and science
- develop specific skills and competencies in mathematics through written work

Nature of the Class: This is a first course in differential equations. I expect familiarity and expertise with the concepts found in Differential and Integral Calculus. The style of the course will be skewed towards practical application of the material, and not very theoretical in nature. However, this is a 300-level math class and I will expect a corresponding level of mathematical rigor and student responsibility.

Methods of Instruction: The method of instruction for most classes will be a lecture/discussion. Students are encouraged to participate in class by asking questions, contributing to discussions, and working problems. Outside of class, students are expected to read the text and complete all assigned homework.

Grading

I will provide you with a number grade on each assignment and on each test, so that you may keep track of your performance. As a guideline, the components will contribute in the following proportion to the final grade:

- Attendance – 2%
- Five Assignments – 10%
- Four exams – 64%
- Final – 24%

Final grades will be assigned using the following percentages: A 90-100; B 80-89; C 70-79; D 60-69; F 0-59. However, I reserve the right to subjectively adjust your final grade. Please see me if you have any question about how you stand.

Course requirements and policies:

a. Calculators and Computers: You may use a calculator on all exams and quizzes. Calculators with symbolic algebra capability (e.g. TI-89 or TI-92) **will not** be allowed during exams. Computers **will not** be allowed during exams.

b. Attendance: You are expected to attend class on time every day. However, if you miss a day, it is up to **you** (not me, or your classmates) to catch up and learn what you have missed.

c. Examinations: There will be four exams and one cumulative final exam. Exams will be given on the days indicated on the schedule. Make-up exams will be considered only for university excused absences and documented medical emergencies, but only if I have been contacted before the exam. The lowest exam score will be replaced by the grade on the final.

Presentation is important. Please turn in your solutions neatly written. Note that “solution” means that each step must be justified with mathematical steps that are easy to follow, and should contain a boxed final answer, when applicable.

d. Homework: There will be numerous homework problems each week, but they will not be graded. The importance of homework cannot be over-stressed: one can only learn mathematics by doing many exercises! Doing homework and writing up the solutions allows you to test yourself to see whether you really understand the material. This also protects you from being "surprised" on the exams.

e. Assignments: The assignments will allow you to investigate applications of differential equations as well as synthesize concepts and techniques. Late assignments **will not** be accepted under any circumstances. Feel free to turn them in early, email them or slide them under my door (KC 318).

f. Honor Code: It is expected that students are familiar with and will comply with the terms of the University's Academic Honor Code. Collaboration on homework and projects is allowed and encouraged, but giving or receiving help of any kind on exams is strictly prohibited.

g. Accessibility: Please let me know immediately if you have a learning or physical disability requiring accommodation. For more information, contact the Office of Counseling and Health Education at 488-2663.

Topics

Introduction

Definitions and terminology (1.1)

First Order Differential Equations

Quantitative technique (2.2-2.5)

Qualitative technique (2.1.2)

Existence-uniqueness theorem (1.2)

Numerical technique (2.6)

Higher Order Differential Equations

Algebraic properties of solutions (4.1.1, 4.1.2)

Homogeneous equation (4.2, 4.3)

Nonhomogeneous equation (4.1.3, 4.4, 4.6, 4.7)

Systems of First Order Linear Homogeneous Differential Equations

Algebraic properties of solutions of linear systems (8.1)

The eigenvalue-eigenvector method of finding solutions (8.2)

Laplace Transform

Definition and properties (7.1, 7.2.1)

Solve initial value problems (7.2.2, 7.3, 7.4.1, 7.5)

Applications (1.3, 3.1, 5.1)

Tentative Schedule

Week #	Monday	Tuesday	Wednesday	Thursday	Friday
1	5/19/08 Intro, 1.1	5/20/08 2.2, 2.3, Assign 1	5/21/08 2.4, 2.5	5/22/08 2.5, 2.1.2, Assign 2	5/23/08 2.1.2, Review
2	5/26/08 No Class	5/27/08 Exam 1	5/28/08 1.2, 2.6	5/29/08 4.1.1, 4.1.2	5/30/08 4.2
3	6/2/08 4.2, 4.3, Assign 3	6/3/08 4.3, Review	6/4/08 Exam 2	6/5/08 4.1.3, 4.4	6/6/08 4.6, 4.7
4	6/9/08 8.1, Assign 4	6/10/08 8.2, Review	6/11/08 Exam 3	6/12/08 7.1, 7.2	6/13/08 7.3
5	6/16/08 7.4.1, 7.5, Assign 5	6/17/08 7.5, Review	6/18/08 Exam 4	6/19/08 Review	6/20/08 Final Exam

Homework

One can only learn mathematics by doing many exercises!

1.1: 1, 2, 4, 5, 7, 11-17 odd, 21, 23, 25, 27, 28, 29, 31
 2.2: 1-27 odd
 2.3: 1-33 odd
 2.4: 1-13 odd, 17, 19, 21, 23, 27, 29 (use integration table), 31, 33, 37
 2.5: 1-29 odd
 2.1.2: 19-29 odd

1.2: 1-6, 17, 19, 21, 23, 25, 27, 31
 2.6: 1, 3
 4.1.1 & 4.1.2: 1, 3, 9, 10, 15, 17, 19, 21, 23, 26, 27
 4.2: 1-15 odd
 4.3: 1, 3, 5, 7, 9, 10, 11, 13, 15, 17, 18, 29, 30, 31, 32, 33, 37, 39, 40

4.1.3: 31, 35
 4.4: 1-19 odd, 28, 29
 4.6: 1-5 odd, 9-23 odd, 24
 4.7: 1, 3, 5, 6, 7, 8, 11, 12, 19, 20, 21
 8.1: 1, 2, 11, 13, 17
 8.2: 1, 3, 5, 6, 13, 19, 20, 21, 29, 33, 35, 37, 46

7.1: 1-11 odd, 19-31 odd
 7.2: 1, 3, 4, 5, 7, 8, 9, 11, 13, 15, 17, 18, 19, 31, 33, 34, 35, 36, 37, 38
 7.3: 1-15 odd, 23, 27, 37-47 odd, 55, 57, 59, 63, 65
 7.4.1: 1-13 odd
 7.5: 1, 3, 4, 5, 6, 7, 9, 10

Please note that this schedule may vary according to our progress in class.