

MATH 275

CLASS SYLLABUS Spring 2014

Course: Ordinary Differential Equations
Section Number 3360: TTH 5:15-6:40 p.m.

Instructor: Dr. R. L. Smazenka
Office Hours: TTH 1:30 – 3:00 and 7:00 – 8:00
Or by appointment
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Text: **Differential Equations with Modeling Applications**, 10th edition
Dennis G. Zill, author

Important Dates: Last day to drop without a “W”: Sunday, 2-23-14 (internet)
Last day to drop with a “W”: Sunday, 5-11-14 (internet)
Date of Final: Thursday, June 5, 2014, 5:30-7:30 PM

Course Outline

We will cover most of the first eight chapters of the textbook. After introducing some basic definitions we begin by treating the cases of separable and exact equations. Solutions by numerical methods and substitution are also covered. A brief introduction to qualitative analysis for autonomous equations using phase portraits is given. Selected first order linear and nonlinear models are covered next. We next treat higher order linear initial-value and boundary-value problems. Methods here include reduction of order, undetermined coefficients, and variation of parameters. Solving a system of such equations is introduced and the Cauchy-Euler equation is treated. Models for both damped and undamped spring-mass systems are studied next. Series solutions about both ordinary and singular points are covered next. We next develop the Laplace transform and apply this technique to equations with only piecewise continuous input functions. Our last topic introduces solutions of systems of linear differential equations.

I personally feel that success in more advanced mathematics courses depends to a large extent on a basic understanding of mathematical logic. The ability to read and understand theorems and definitions and follow a proof requires that the student be able to translate a statement into a proper logical proposition, understand when the proposition is true or false, and consider logically equivalent propositions. For this reason I will introduce these topics as they arise and are related to topics from the textbook.

Class Website:

The class website is an important tool for you to track your grade in the class and view exam and quiz solutions. Homework assignments from the book and project topics will also be posted here. The site can be accessed by clicking on the Math 275 tab at <http://www.lamission.edu/~smazenrl>.

Homework and Exams

Homework will be assigned, collected and a subset will be graded. These are due at the beginning of class on the day specified. No late homework will be accepted. Homework must be neat, orderly, with solutions clearly indicated. Since the exams will closely resemble homework exercises, **success in this course strongly depends on diligently completing all assignments in a timely fashion**. I cannot stress this last point enough! We will have four exams and a comprehensive final. No make-up exams will be given. I will replace the lowest exam score with the score from the final exam. Successful students should plan to spend at least 4 hours of study outside of class for each hour of discussion. This translates into a minimum of 12 additional hours per week.

Special Note: The textbook is extremely good. The author provides a high level of mathematical rigor and many exercises are quite intriguing and revealing. It is rare to find a text for an introductory course that I enjoy reading, but Zill's book is one of those. I strongly encourage you to read the text carefully. The lectures are designed as a supplement to and not an alternative for the textbook.

Class comporment

All students are expected to arrive on time. Late arrivals are disruptive to both the lecturer and students. We will have a short break about midway through the class period. Once you are seated, do not leave the room until the break. Such comings and goings are also disruptive. Students must turn off all pagers and cell phones while in class. Students are encouraged to ask questions and make comments on the lecture material. This should be done in a courteous manner by raising one's hand and being recognized. Side conversations between students that disrupt the flow of the lecture will not be tolerated. It is the student's responsibility to manage his or her academic workload. Should a student decide to stop attending class it is their responsibility to drop the class. All students appearing on the grade roster will receive a grade regardless of whether they are attending classes or not.

Grading

Your final grade is based on the homework and exams with percentage contribution to your grade as follows.

Homework	7
Exams	65 %
Final	28 %

Schedule Math 275 Spring 2014				Math 275 Course Objectives
Week	Date	Tuesday	Thursday	
1	February 11	1.1 – 1.2	1.2-1.3	<ol style="list-style-type: none"> 1. Classify differential equations; solve initial values problems. 2. Solve differential equations by separation of variables, by substitution and numerical methods. 3. Solve linear and nonlinear equations and systems; solve modeling problems. 4. Solve higher order differential equations; solve equations with constant or variable coefficients; solve equations using the Cauchy-Euler method. 5. Solve linear and non-linear boundary value problems. 6. Solve linear equations by power series about ordinary and singular points. 7. Determine Laplace transforms and their inverses; solve differential equations using Laplace transforms and translation theorem. 8. Solve homogenous linear first-order systems.
2	February 18	2.1-2.2	2.2-2.3	
3	February 25	2.4-2.5	2.5, 3.1	
4	March 4	3.1 – 3.2	3.2-3.3	
5	March 11	4.1-4.2	Exam Ch 1, 2, 3	
6	March 18	4.2-4.3	4.3, 4.5	
7	March 25	4.5-4.6	4.7-4.8	
8	April 1	4.8, 5.1	5.1-5.2	
9	April 8	Spring Break No Class	Spring Break No Class	
10	April 15	5.2	6.1 Review	
11	April 22	Exam Ch 4, 5	6.2	
12	April 29	6.3	7.1-7.2 Review	
13	May 6	Exam Ch 6	7.2, 8.1	
14	May 13	8.1-8.2	8.2-8.3	
15	May 20	8.3	Exam Ch 7, 8	
16	May 27	No Class	Final Review	
17	June 3	No Class	Final exam 5:30-7:30 pm	

Student Learning Outcomes

Upon successful completion of the course students should be able to:

1. Formulate an appropriate differential equation to model and solve applied problems.
2. Solve higher-order constant-coefficient linear differential equations and systems of differential equations using the method of undetermined coefficients.
3. Find Laplace transforms and inverse transforms, and apply these to solve differential equations.
4. Apply power series methods to find solutions of linear differential equations.