

# MTH 212 Differential Equations, Section 04

**Instructor:** Steven Leon  
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Office hours: Tues, Thurs 2:00 -3:00, Mon, Wed 1:30 - 2:30, or by  
appointment.  
These office hours may be revised during the semester.

**Textbook:** *A First Course in Differential Equations with Modeling Applications, 9th ed.*  
by Dennis Zill, Thomson, Brooks-Cole Publishing Company.  
We will cover all or parts of chapters 1–5, 7, 8, 9.  
*Note: The other sections of MTH 212 are using different textbooks, so  
be sure you purchase the Zill book for MTH 212.*

**Exams:** There will be 3 in class exams each worth 100 points. There will also be a final exam worth 200 points. No make-ups unless you have a note from your doctor. The exams will be closed book. You are not allowed to use notes during the exam. Hand calculators may be used for arithmetic and to check your answers, but you must show all of your work in solving exam problems. If you have a correct answer to a problem but have not shown your work, you could end up not receiving any credit for the problem. Exams are *not* graded on a curve. The grading scale for 100 point exams is roughly:  
90-100 A, 80-89 B, 70-79 C, 60-69 D, Below 60 F  
If the final exam gives evidence of improvement, the instructor may, at his discretion, weigh the final exam more heavily.

**Assignments:** Assignments for each section are listed below. You should work the assignment for a section as soon as it has been covered in class. We will answer questions on the previous assignment at the beginning of each class and there may even be a quiz on the assignment at that time. If you have problems on assignments do not hesitate to come to the office of the instructor for help. Additionally there are tutors available for MTH 212 in Room 10 in the basement of Group I.

**Course objectives:** Students should be able to do each of the following:

1. Solve homework problems in the book and similar types of problems that occur on exams.
2. Be familiar with the terminology and vocabulary used in differential equations.
3. Be able to solve differential equations, systems of differential equations, and initial value problems.
4. Be able to set up mathematical models as initial value problems.
5. Use the MATLAB to solve initial value problems and also to visualize the solution to initial value problems.
6. Be able to use Laplace transforms to solve initial value problems.

**Attendance:** Students are required to attend each class. If you miss 2 or more classes and do not have notes from doctors to account for your absences, you may end up failing the course.

**Grading:** Your grade will be based on how well you score on the exams and quizzes. For students that attend regularly and keep up, the instructor at his discretion may consider replacing the student's lowest exam score for the semester by student's score on the final exam (scaled appropriately).

**Academic integrity:** **Academic dishonesty will not be tolerated.** Any student caught cheating on an exam will receive an F for the course. Academic dishonesty includes using crib notes, copying from another student or letting another student copy from you during an exam.

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## Syllabus and Assignments

### **Chapter 1 Introduction to Differential Equations**

**Section Exercises**

- 1.1 1-23 odd
- 1.2 1-23 odd
- 1.3 1-10,15,16,17,19,20

### **Chapter 2 First Order Differential Equations**

**Section Exercises**

- 2.1 1-11 odd (use MATLAB), 13, 14, 19-29 odd, 38
- 2.2 1-25 odd
- 2.3 1-29 odd
- 2.6 MATLAB project (in class handout). Textbook Exercises 1,2

### **Chapter 3 Modeling with First-Order Differential Equations**

**Section Exercises**

- 3.1 1-29 odd, 39, 40
- 3.2 1, 3, 5
- Exam 1** Exam covering chapters 1, 2, 3

### **Chapter 4 Higher Order Differential Equations**

**Section Exercises**

- 4.1 1-9 odd, 15-27 odd, 31, 33
- 4.2 no assignment
- 4.3 1-33 odd
- 4.4 1-9 odd
- 4.5 1-43 odd, For the following exercises you need only determine the form of the particular solution in terms of coefficients A, B, C, etc. You need not solve for the coefficients. 51, 52, 55, 56,57, 59, 63

## **Chapter 5 Modeling with Higher Order Differential Equations**

### **Section Exercises**

**5.1** 1, 3, 5, 9, 17-23 odd, 29, 45, 47, 49

**Exam 2** Exam covering Sections 4.1, 4.3, 4.4, 4.5, 5.1, 3.3

## **Chapter 8 Systems of First Order Differential Equations**

**3.3** 5, 6, 7a, 13, 15, 16a

**8.1** 1-13 odd, 14, 21, 23

**8.2** 1-7 odd, 10, 12, 13, 19, 21, 33, 35, 37, 46

## **Chapter 7 Laplace Transforms**

### **Section Exercises**

**7.1** 1, 3, 7, 9, 10, 19-33 odd

**7.2** 1-29 odd

**7.3** 1-27 odd, 37-61 odd

**7.2, 7.3** Section 7.2 31-35 odd, Section 7.3 21-29 odd

## **Chapter 9 Numerical Solutions of Ordinary Differential Equations**

**9.4** 1, 2 (In Exercise 2 it is not necessary to find the exact solution and compare computed values to exact solution values)

Use Euler's Method on the model problems in Exercises 9, 10 a, c on page 111 of the book.

In each case use stepsize  $h = 0.1$  and compute estimates to  $x(0.1)$ ,  $y(0.1)$ ,  $x(0.2)$ ,  $y(0.2)$ .

**9.2 & 9.3** If time allows we will cover these sections and do computer exercises for these sections in class.

**Exam 3** Exam covering chapters 7, 8, and 9

**Final Exam** Tues., May 22, 2012. 8:00-11:00 am. Comprehensive exam covering all of the sections listed above.