

Math 336 Elementary Differential Equations (Fall 2015)

Class Times and Location

Tues and Thurs 9:30- 10:45 a.m.

Room: Burruss 0034

Course Description

The human language for laws of nature is differential equations. Much of contemporary science and engineering (planetary motion, heat flow, fluid flow, ...) is based on formulating and understanding corresponding differential equations. **Ordinary differential equations (ODEs)** are those that involve functions of *one variable (time, space, etc...)* and *their derivatives*. (On the other hand, partial differential equations deal with functions of *several variables and their partial derivatives*.) In this course, we will focus on first and second order ordinary differential equations, linear systems and linearization of nonlinear systems. We will discuss existence and uniqueness of solutions and their qualitative properties. We will learn how solve our ODEs *both numerically and analytically*. Physical applications will motivate almost all of our ODEs, and our solutions will be interpreted in terms of their physical implications.

Nature of the Course Content (directly from the course catalog)

3 credits. *Offered on demand.*

Development of techniques for obtaining, analyzing and graphing solutions to differential equations, with emphasis on first and second order equations. *Prerequisite: MATH 237.*

Instructor

Hala Al Hajj Shehadeh
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Office phone: 540 568 3807
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Office Hours

Wednesday 9:30-12:00 or by appointment.

Course Webpage

On my website (<http://educ.jmu.edu/~alhajjhy/>). Syllabus, handouts, **Homework assignments**, announcements will all be found there.

Course Text: *Differential Equations: Theory, Techniques and Practice. Simmons and Krantz. McGraw-Hill 2007. (The Walter Rudin Student Series in Advanced Mathematics.)*

We will loosely follow the book, covering topics from chapters 1, 2, 3, 4, 9, 10 and 11. Some material will only be covered in class and will not be from the book. Conversely, you are responsible for any material in the required chapters which is not covered during class.

Grading Policy

Written homework assignments **which include Matlab projects: 25%**.

Webwork: 15%

In-class midterm exam: 30%

Comprehensive final exam: 30%

Please let me know in the first two weeks of classes about any documented condition that requires extra time to complete the exams.

Talk to me during the semester if you have questions about your performance in the class. Do not sit there and wonder. Ask me!

Attendance Policy

You should attend class faithfully. I take attendance every class period. Some material may only be covered in the classroom. You should contact me in case of any illness.

Exam Schedule

In-class Midterm Exam: **Thurs, October 15 2015.**

In-class Final Exam: **Thurs, December 17 2015. 8:00- 10:00 a.m.**

You **cannot** reschedule an exam. A makeup exam is possible only due to an (extreme) emergency situation.

H.w. Assignments

There will be weekly homework assignments and they are divided into two parts:

1. *Webwork*: The straightforward but sometimes computationally annoying part of the homework. Here is the link, and you will need your JMU e-id and password to be able to log in. https://webwork.cit.jmu.edu/webwork2/MATH336_0001_FA15/
2. *Written*: This is shorter, but has problems which are more involved. It will also include computer projects. You can use Matlab, Maple or Mathematica to complete your computer projects. You have to submit a neat stapled set of solutions, and I will not accept a submission which is not organized or well written. This is the time to practice communicating and writing mathematics neatly.

Written homework and Webwork will be assigned and collected depending on the pace of the class.

Resources You need to use all available resources, including your classmates, the internet, the library, and other differential equations books. Read your book, your class notes, the weekly highlights, and discuss the material with other people. The class is *fast paced* and you are responsible for utilizing all available resources to perform well and have a deep understanding of the class.

Honor code

Remember that JMU has a strict [honor code](#). While you are strongly encouraged to work with others in this class, the work you submit must be your own. Copying someone else's work won't help you learn the material and might just get you expelled.

Tentative Plan

We will loosely follow the textbook, so class attendance is so important.

We will mostly follow the following plan. We might be a bit faster or slower on few occasions. Applications will be embedded into the topics. There is a total of 28 lectures.

Week 1: Course introduction and chapter 1

Week 2: Chapter 1

Week 3: Chapter 1

Week 4: Chapter 9

Week 5: Chapter 9

Week 6: Chapter 2

*Week 7: Chapter 2 **midterm exam***

Week 8: Chapter 2 and chapter 4

Week 9: Chapter 4

Week 10: Chapter 4

Week 11: Chapter 10

Week 12: Chapter 10 and chapter 11

*Week 13: **Thanksgiving break***

Week 14: Chapter 11 and chapter 3

Week 15: Chapter 3