



Math 216-001 Spring Term 2018

Theory of Differential Equations

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SYLLABUS: MATH 216-001, Spring 2018

Instructor: Dr. Stephen Saperstone, Exploratory Hall 4406; TEL: 703.993.1460; FAX: 703.993.1491; Mobile/Text (to be used in extreme circumstances when you can't reach me otherwise): 703.307.4370

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Office hours: MW 12:00pm -1:00pm, and by appointment in Exploratory Hall - 4406

Classroom: The lectures meet in Exploratory Hall Room 4106, MW @ 1:30pm-2:45pm

Text: There is no text book. All material is available online at [ODEweb](#).

Content: This course will cover most of the material in Lectures 1-12, and 14-27

Prerequisites: A grade of at least C in Multivariable Calculus (Math 213 or 215) & Linear Algebra (Math 203)

Course Objectives:

1. Develop techniques to solve a variety of scalar ODEs and higher dimensional linear ODEs and linear systems of ODEs. Determine qualitative properties to solutions of nonlinear ordinary differential equations without solving the equations.
2. How to analyze the behavior of solutions to nonlinear ODEs without having a formula for the solutions. Most ODEs require this "out of the box" thinking.

Software: Mathematica is the computer algebra software of the Mathematical Sciences Department. You may want to use Mathematica in your homework assignments. Mathematica is available to all students for free. Scroll down for student directions at the [Mathematica at Mason website](#).

Homework:

- Homework exercises will be assigned and due weekly at recitation. Late homework will not be accepted. Most solutions will be posted at the time the homework is returned. Some also will be discussed in the recitations. Each exercise solution will be graded on an integral scale of 0 to 4. A grade of 5 will be assigned to an exceptional solution.
- Solving problems is perhaps the most important component of this course; it provides you with regular feedback on whether or not you are keeping up with the material, and it challenges you to creatively apply what you have already learned. See the [assignment](#) page.
- Collaboration is an important component of learning mathematics and I encourage you to work with your classmates. By "work with," I mean that every member of a collaborative effort is expected to be an active contributor. Each student must write up his/her solutions on their own. Your solution may reflect the group work, but the HW paper you submit cannot be a copy of another's work..
- Use Wolfram Alpha, Mathematica, Matlab, or any other software you like just to check your solutions. I will not accept software solutions other than plots.

- I encourage you to use LaTeX to write your HW.

Exams: Thwo exams *tentative* dates:

Exam 1	7 March
Exam 2	2 May

Project: I will assign a project shortly after spring break. Details will be given then.

Determination of Final Grade: Grades are based on the following distribution of credit.

Homework	40%
Mid-term Exam 1	20%
Mid-term Exam 2	20%
Project	20%

Grading Scale: See the following table.

A+	A	A-	B+	B	B-	C+	C	C-	D	F
∞ - 99	98 - 92	91 - 90	89 - 88	87 - 82	81 - 80	79 - 78	77 - 72	71 - 69	68 - 60	59 - 0

Piazza: [Piazza](#) is a free platform for instructors to efficiently manage class Q&A. Students can post questions and collaborate to edit responses to these questions. Instructors can also answer questions, endorse student answers, and edit or delete any posted content. Piazza is designed to simulate real class discussion. It aims to get high quality answers to difficult questions, fast! (The name Piazza comes from the Italian word for plaza--a common city square where people can come together to share knowledge and ideas. We strive to recreate that communal atmosphere among students and instructors.) You have already received an email from Piazza that encourages you to sign up.

Academic Integrity: GMU is an Honor Code university; please see the Office for Academic Integrity for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

Updates: Check the web site for updated information regarding exam dates, homework assignments, and exercise hints/solutions.

Registrar Information: [Important Dates](#)

Disability: If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Resources at 703.993.2474. All academic accommodations must be arranged through that office.

How to Succeed in this Course:

- Read the assigned section before each lecture and attend all lectures. Twelve-Fifteen (12-15) hours per week may not even be enough study time for many of you. It will be up to you to read and digest the lecture material as I cannot and will not speak to all the topics in each lecture. I encourage you to ask questions about that which you don't understand. You can do this in a subsequent lecture, at my office, or in recitation.

- Have a pencil & writing tablet with you as you read the text and your lecture notes. Cover up the solution to the worked out examples before you read the solution. If you get stuck, just read as few lines as you need in order to determine how to proceed. Don't read the whole solution unless you are truly jammed.
- Join or create a study group. Brainstorm concepts, examples and solutions to exercises together. Try many more exercises than the assigned ones. I will post my solutions to the graded exercises at this website.