

MA 573 Differential Equations

Course Information: This is a “second” course in differential equations. The prerequisite is a “first course” (like our MA 226) along with linear algebra (e.g., MA 242). Other courses are, of course, helpful since they add to your general mathematical maturity.

Our primary goal is to make the study of differential equations more useful. We will work on expanding techniques you have available for studying differential equations and looking at applications of differential equations in different contexts. To the extent possible, each topic we cover will be associated with and introduced with an application. Of course, the applications may, or may not, be specifically what you are interested in—I hope you will take the opportunity to search out applications in topics of your own interest. Let me know what those are and we can try to find applications that are relevant.

The distinction between “pure” and “applied” mathematics is artificial. All mathematics is applied since all mathematics is developed to answer questions. Sadly, there are so many useful ideas in mathematics that your courses so far have had to focus on techniques almost exclusively just to fit everything in. In this class, we cover many new ideas and techniques, but will emphasize the applications as much and as often as we can.

Nuts and Bolts-Grades: There will be one midterm (more or less in the middle of the term) and a final at the end. There will be frequent (almost every class) homework assignments of one or two problems and occasional longer assignments. There will also be a few longer homework assignments (more problems with more time), perhaps weekly to monthly.

Since there are relatively few students, you will also have a short oral exam at the end of the semester. (We’ll schedule these after Thanksgiving.)

- Midterm : 25%
- Final: 30%
- Homework: 35%
- Oral exam: 10%

The Homework and other assignments will be made in class. You are responsible for knowing what was assigned and what went on in class—make sure you check with a classmate if for some reason you can not attend. (**Note:** Homework will only be announced in class, I will not post or email individuals the homework under any circumstances. Make sure you make contacts in the class with fellow students with whom you can check for class information.)

NO LATE HOMEWORK WILL BE ACCEPTED FOR ANY REASON—REALLY. If you are ill you can send your homework with a classmate (do not email your homework to me—send it to a classmate to be printed and handed in on paper). I will drop the lowest homeworks of each type (how many I drop depends on how many assignments of each type—e.g., “daily” assignments I’ll drop 2).

Books: We will use several books during the semester. These include

S. Strogatz,
R. Devaney,
H. Pollard,

I may make a few pages available on scan on line (not violating copyright, of course)–I think the bookstore has Strogatz and it is a good book to buy if you like buying books (I do...).

Contact: I will use the email address on the course list (so the email address that BU has for you) for information pertaining to the class. Please be sure you check your email regularly. The best way to contact me is via email

rockford@bu.edu

Office hours will be posted at

math.bu.edu/people/rockford

Since my schedule does change, make sure you check this page before making a long trip. My office is

Room 267, MCS 111 Cummington Mall

Sources of help: This isn't a very big class...so if you have a question, ask it! Also, make sure you know other students in the class so if you can't reach me (I don't check email that often and I go to sleep early!) you have somebody else to ask.

MAKE ABSOLUTELY SURE you follow the standards of good academic citation–if you read something on a problem, give the reference- if you talk to someone about a problem, even if you have all the good ideas, thank them for the discussion. If someone gives you a particularly good idea, thank them in your solution! Mathematicians like to talk and are fairly easy going with rules governing plagiarism–but never take someone else's idea without paying for it by giving them credit.

Comments: To be successful in this class, your brain will have to change. You should be happy that I do not have access to your brain, but this means that any changes that happen will be the result of your own hard work. The material is difficult, but worth it. Good luck.