Math 5525, Spring 2019, MWF 11:15–12:05, Vincent Hall 113

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Office Hours: Monday and Friday 3:35-5:00.

A brief description of the course: In this course, we will study systems of ordinary differential equations. We will solve autonomous linear equations explicitly (assuming we can find eigenvalues and eigenvectors of the matrix of the system) and develop techniques for qualitative analysis of solutions of nonlinear systems.

Prerequisites: [2243 or 2373 or 2573], [2283 or 2574 or 3283]. Knowledge of multivariable calculus and some linear algebra (mainly eigenvalues, eigenvectors) will be assumed. The textbook contains sections on linear algebra, which you can use for review.

Text: Differential equations, dynamical systems and an introduction to chaos, by Hirsch, Smale and Devaney; 3rd edition. Chapters 1–3, 6–9 and selected material from other chapters will be covered. Some results from higher-dimensional linear algebra (Section 5) will be reviewed briefly.

Advance reading is recommended.

The text and the course emphasize analytical methods, but occasionally we will do numerical experiments using Maple. I encourage you to familiarize yourself with basics of this or similar software, such as Mathematica.

Homework: There will be 5-6 homework assignments and selected problems will be graded. You will have enough time for each assignment; no late homework will be accepted. One homework (the worst grade or a missed homework) will be dropped at the end. You are allowed, even encouraged, to discuss homework problems with other students. However, you are expected to work out and write down the solutions yourself, and be able to explain them upon request.

Exams and Grades: The grades will be based on homework and three equally weighted exams. The exams will not be cumulative (each will cover a part of the material). Textbooks and your personal hand written notes (not copies of notes from somebody else) are allowed at all exams. Scientific calculators are allowed, but are not really needed. No other technology is allowed.

The final grade will be computed using the following scheme:

homework 15%, 2 best exams 70% (35% each), worst exam 15%

Your absence at an exam can be excused for serious and documented reasons only. Unless you have an emergency, you should inform me beforehand if you need to miss an exam. Your grade will then be determined by the remaining two exams or, in exceptional cases, a make-up exam will be arranged.

Exam Dates:

Exam 1: Friday, February 22
Exam 2: Friday, April 5
Exam 3: Monday, May 6

Other: Please refrain from using cell phones or other screens in class for purposes not related to the course, they are a distraction not just to you. Academic dishonesty in any portion of the course shall be grounds for awarding a grade of F or N for the entire course. Incomplete will only be assigned in extraordinary circumstances, and only if a major part of the class work has been completed.