
GMU Department of Mathematical Sciences
Math 413: Modern Applied Mathematics I
Fall 2017
Syllabus

Instructor:

Prof. Maria Emelianenko

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Office: Room 4454, Exploratory Hall

Office Hours: MW 3-4pm and by appt

Time and Room:

MW 1:30-2:45pm Robinson Hall A, Room 101

Course materials, assignments and announcements will be available on Blackboard.

Prerequisite: Grade of C or better in MATH 203 and 214 or 216.

Textbook: No textbook is required. The course will use the following supplementary texts:

1. Steven H. Strogatz, "Nonlinear dynamics and chaos", Westview Press, 1994
2. J. David Logan "Applied Mathematics", 4th edition, Wiley, 2013
3. M. Holmes, "Introduction to the Foundations of Applied Mathematics", Springer, 2009
4. D. Basmadjian, "Mathematical Modeling of Physical Systems", Oxford University Press, 2003
5. T. Hastie, R. Tibshirani, J. Friedman, "The elements of statistical learning", Springer, 2001

Course Description:

This course describes the role of pure and computational mathematics tools in modern data-driven world. It emphasizes interplay between discrete and continuous mathematics and shows how mathematical structure can be revealed by various equilibrium and dynamic models. We will learn how to formulate, analyze and solve real problems arising in the fields of science, engineering, social networks, finance etc. We will be performing careful analysis of the real data sets, studying their structure, then building and analyzing discrete or continuum models describing their behavior. Both analytical and computational assignments will be given and students will be expected to make 10-minute in-class presentations after completing each of the core assignments. In-class demonstrations will employ MATLAB tools and the use of MATLAB will be expected when doing computational assignments.

MATLAB is a computing environment with programming capability, good graphics, and powerful library functions. It is available on campus on the Mason cluster and several Unix computer labs. Alternatively, a student version can be purchased at the bookstore at a reasonable price. MATLAB tutorials will be available at our class Blackboard page if you are new to MATLAB. Alternatively, the manual which comes with the PC version is very complete.

Grading policy:

Your grade in this course will depend on your performance on graded projects and one final exam.

Tentative weight of assessment components:

- Projects and graded homework assignments: 70%
- Final exam (TBA): 20%
- Participation: 10%

Occasional practice problems will be given that will not count towards the final grade, unless specifically noted. I strongly encourage all participants to do these exercises in order to gain the necessary grasp of the material and perform well on exams and graded assignments.

Academic Policies

All GMU policies regarding ethics and honorable behavior apply to this course. 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.