GMU Department of Mathematical Sciences
Math 414: Modern Applied Mathematics II
Spring 2021
Syllabus

Instructor:
Prof. Maria Emelianenko
Email: memelian@gmu.edu
Office Hours: T 10:30-11:30am on Zoom (link in BB)

Time and Room:
Thursday 10:30-11:45am on Zoom (synchronous lecture, link on BB)
Course materials, weekly recordings, assignments and announcements will be available on Blackboard. You will be expected to watch the weekly lecture recording before coming to class on Thursday.

Prerequisite: Grade of C or better in MATH 413.

Textbook: The textbook we will follow is "Introduction to the Foundations of Applied Mathematics" by M. Holmes, Springer, 2009. We will cover Chapters 4-7 this semester.

The course will use the following supplementary texts:

1. 1. M. Shearer, R. Levy, "Partial Differential Equations: an introduction to theory and applications", Princeton University Press, 2015
2. J. David Logan "Applied Mathematics", 4th edition, Wiley, 2013

Course Description:
Continuation of MATH 413, which involves a synthesis of pure mathematics and computational mathematics. Fourier analysis and its role in applied mathematics is developed (e.g., differential equations and approximations). Discrete and continuous aspects are emphasized in computational models.

We will learn how to formulate, analyze and solve real problems arising in the fields on science and engineering. Both analytical and computational assignments will be given and students will be expected to make 15-minute in-class presentations after completing a group project. Weekly homework problems will be given that will count towards the final grade. I will discuss solutions in class.In-class demonstrations will employ MATLAB tools and the use of MATLAB

will be expected when completing computational assignments.

Software:

MATLAB is a computing environment with programming capability, good graphics, and powerful library functions. It is available 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 online documentation is available at https://www.mathworks.com.

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: 30%
- Midterm exam (TBA): 25%
- Take-home final exam: 30%
- Participation: 15%

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:

It is expected that students adhere to the George Mason University Honor Code as it relates to integrity regarding coursework and grades. The Honor Code reads as follows: "To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the University Community have set forth this: Student members of the George Mason University community pledge not to cheat, plagiarize, steal and/or lie in matters related to academic work." More information about the Honor Code, including definitions of cheating, lying, and plagiarism, can be found at the Office of Academic Integrity website at http://oai.gmu.edu.