

Numerical Analysis

Math 446/OR 481, Sander, Spring, 2021

Lecturer: Dr. E. Sander (esander@gmu.edu)

LAs: Taylor Fountain (tfountain@masonlive.gmu.edu) and Catherine Haggerty (chaggert@masonlive.gmu.edu)

Textbook: T. Sauer, *Numerical Analysis*, Pearson, 3rd Edition. Useful files are available from the [textbook website](#)

Prerequisite: MATH 203 and CS 112.

Active Learning Sessions: Active learning sessions are the synchronous portion of the course. They occur on Tuesdays on Zoom during the scheduled class time 3-4:15pm. Active learning sessions include both the instructor and the LAs. Students work in groups. This is a required part of the course.

Lectures: Lectures videos will be posted weekly. This is a required part of the course.

Office hours: Both the lecturer and the LAs office hours will be conducted online for drop in no appointment needed. Hours and links are posted on Blackboard.

Blackboard: Blackboard is the home for all class activities. Any updates, assignments, etc. will appear on Blackboard.

Schedule: [Here is a semester schedule.](#)

Videos and Checkups: Before each active learning session, the student is responsible for reading the assigned sections of the text and viewing the assigned videos. Each video is connected to a Checkup, which consists of questions that test your basic comprehension of the material. Checkups are due before the class meetings.

Textbook Exercises: The textbook exercises are listed on the schedule. They should be attempted before class, and completed before attempting the weekly theoretical homework.

Homework is due on Fridays at 11:59pm. Homework consists of two pieces:

- (i) Theoretical Homework based on the textbook exercises
- (ii) Coding, in the form of Prelabs and Labs, as listed on the schedule.

Grading:

- Weekly Checkups (4 pts. each)
- Weekly Theoretical Homework (15 pts. each)
- Biweekly Prelabs (10 pts. each)
- Biweekly Labs (15 pts. each)
- Final Exam (70 pts.)

Grades in the course will be based on your INDIVIDUAL effort on the exams and projects. Discussion of course topics with others is helpful and encouraged; however, all work toward the solution of homework projects submitted for credit, including computer code and written summaries, must be done SOLELY by you.

Matlab: The software package Matlab will be required for analysis and presentation of data. Matlab is a computing environment with programming capability, good graphics, and powerful library functions. The university negotiated a new site license that gives much better access than ever before. To get access to Matlab, please go to the [GMU Matlab Access Website](#).

I strongly suggest you sign up for a [GMU Math Scientific Computing Workshop](#) introducing Matlab. These courses are offered for no charge to all GMU Math students and are a handy way to get up and running quickly. Matlab tutorials can be found readily on the internet. There is a pretty good one at Mathworks, and another one in the textbook's appendix.

Course description: Design and implementation of algorithms for the solution of scientific and engineering problems. Emphasis will be placed on the written and graphical presentation of solutions. The course will cover the following topics.

- Floating point arithmetic
- The solution of nonlinear equations in one variable
- The solution of systems of linear equations
- The solution of nonlinear systems
- Interpolation and polynomial approximation
- Curve-fitting; cubic and Bezier splines
- Least squares problems

Test Dates

- Final Exam: Tuesday, 5/6, 1:30-4:15 (per official university schedule).

Honor Code: The University Honor Code is to be followed. Sharing information of any kind about exams, theoretical homework, or Matlab assignments will result in a grade of zero. Any violations will be submitted to the University Honor Committee.

Office of Disability Services: All academic accommodations must be arranged through the ODS. Please speak to me if this applies to you.
