Instructor

Prof. Matthew Pennybacker. My office is SMLC 226. I will hold office hours on Mondays and Wednesdays from 1–3pm. For most matters, please contact me by email at `pennybacker@math.unm.edu`.

Overview

This course is meant as an introduction to numerical analysis. We will study numerical methods used to solve linear and nonlinear equations, to interpolate and approximate data, and methods for numerical integration and differentiation. We will implement many of these algorithms in Matlab, and begin the course with a Matlab tutorial. The second edition of *Numerical Analysis* by Tim Sauer is required.

Homework

Homework is an important part of this course. A homework set will be assigned most weeks on Friday and will be due the following Friday. **Late homework will not be accepted** unless there are exceptional circumstances. Please contact me as soon as possible if this is the case. You are encouraged to work with each other on the homework, as well as make use of office hours, but **you must hand in all solutions in your own your own words and data**. Note that you will lose points if your work is inconsistent with your final answer. An incorrect answer which is consistent with your work is worth more than a correct answer which is inconsistent with your work. I will drop one homework score when calculating your final homework grade.

Quizzes

There will be weekly in-class quizzes on most Fridays. Each quiz will consist of one or two problems drawn from the current course topics and should take no more than 10 minutes to complete.

Exams

There will be three in-class exams and one final exam. The problems used on the exams will be similar to some of the homework and quiz problems.

Grading

The final grade will be calculated as a fraction of 100 possible points. Quizzes will comprise 20 points, homework 30 points, each in-class exam 10 points, and the final exam 20 points. Passing grades will be assigned using the following point ranges.

A: 90 – 100, B: 80 – 89, C: 70 – 79, D: 60 – 69.

Communication

Please check your UNM email regularly or make sure to forward your email from that address to an account that you check at least once daily during the week. Email is the easiest way for me to communicate important information to the entire class. For the most current information about the syllabus, quizzes, and homework, you can visit the course webpage. Do not hesitate to contact me if you have any questions or you experience any difficulties that may affect your progress during the course.

Accommodations

In accordance with University Policy 2310 and the American Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as the instructor is not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow. Please contact Accessibility Services at 505-661-4692 for additional information.

Sexual Misconduct

In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered "responsible employees" by the Department of Education (see page 15 of `http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf`). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity (`oeo.unm.edu`). For more information on the campus policy regarding sexual misconduct, see `https://policy.unm.edu/university-policies/2000/2740.html`.

Tentative Schedule

Week	Dates	Reading	Topics
1	Aug 22, 24, 26	B.1 – B.6	Matlab tutorial.
2	Aug 29, 31, Sep 2	0.1 – 0.4	Integer and floating point representation, machine epsilon, rounding errors and their effects.
3	Sep 5, 7, 9	1.1, 1.2	The bisection method and fixed-point iteration.
4	Sep 12, 14, 16	1.3 – 1.5	Newton's method and the secant method.
5	Sep 19, 21, 23	2.1	Gaussian elimination. In-class exam 1.
6	Sep 26, 28, 30	2.3, 2.4	LU and PLU factorizations.
7	Oct 3, 5, 7	2.5	Iterative methods.
8	Oct 10, 12	3.1, 3.2	Polynomial interpolation.
9	Oct 17, 19, 21	3.3	Chebyshev interpolation. In-class exam 2.
10	Oct 24, 26, 28	3.4, 4.1	Splines and linear least squares.
11	Oct 31, Nov 2, 4	4.2, 4.3	Mathematical models and QR factorization.
12	Nov 7, 9, 11	5.1	Numerical differentiation.
13	Nov 14, 16, 18	5.2	Numerical integration. In-class exam 3.
14	Nov 21, 23	6.1, 5.2	More numerical integration.
15	Nov 28, 30, Dec 2	6.1	Initial value problems.
16	Dec 5, 7, 9	6.2	Error and stability for initial value problems.