



University of Maine – Department of Mathematics & Statistics
MAT 487 – Numerical Analysis
Fall 2025

Instructor: Jack Buttcane, jack.butt Kane@maine.edu

Lecture: MWF 2:00-2:50pm in Neville Hall 421

Credits: 3

Prerequisites: A grade of C or better in MAT 258, or a grade of C or better in both MAT 259 and MAT 262, or departmental permission.

Textbook: *Numerical Analysis*, third edition, by Timothy Sauer.

Catalog Description: An introduction to computational methods for solving numerical problems. Topics such as interpolation, systems of linear or nonlinear equations, numerical integration, eigenvalues, optimization, ordinary and partial differential equations are considered.

Have you ever wondered how your calculator or computer finds solutions to polynomial equations? Solves systems of equations? Most of mathematics is concerned with finding exact solutions to problems, but not every problem can be solved exactly; numerical analysis is the study of finding approximate solutions, computationally. The main topics we will (time permitting) cover in this class are:

- How floating point numbers are implemented on a computer.
- Interpolation: If we know a function passes through some fixed points, what are good ways of approximating the function between the points?
- Approximating solutions to systems of linear or nonlinear equations.
- Numerically integrating or differentiating functions.
- Approximating solutions to differential equations.
- Finding eigenvalues and eigenvectors of matrices.

We will use the MATLAB software platform for the course, but previous experience in computer programming is not expected.

