MATH385 / MATH685, Numerical Methods I
Spring 2024

Instructor: SA Kwon
Resources: Numerical Analysis, 2nd Ed (Tim Sauer, Pearson Education, 2012); Various.

HUNTER
The City University of New York

#	Topic
01	00 Introduction: Syllabus, Coursework Expectations. 00 Review of Basics: Polynomials, Base 2, Floating Point.
02	00 Review of Basics: Floating Point (continued), Error, Basic Analysis.
03	01 Rootfinding: Bisection, Fixed-Point Iteration.
04	01 Rootfinding: Newton's Method, Secant Method.
05	02 Systems of Equations: Gauss Elimination, LU Factorization, PA-LU Factorization.
06	02 Systems of Equations: Iterative, Symmetric-Positive Definite Matrices, Newton's Multivariate.
07	03 Interpolation: Polynomial Interpolation, Interpolation Error.
08	03 Interpolation: Chebyshev, Cubic Splines, Bezier Curves.
09	04 Least Squares: LSQ, Models.
10	04 Least Squares: QR Factorization, GMRES, Non-Linear.
11	05 Differentiation & Integration: Differentiation.
12	05 Differentiation & Integration: Newton-Cotes, Romberg.

This course provides an introduction to Numerical Methods. The later topics may be more of an overview, less in-depth than earlier topics. That will depend on the overall profiency of all students enrolled this semester. Coursework requires coding; however, a programming language is not a prerequisite. Python is supported but a limited number of other languages will be accepted.

There is no required textbook but lecture notes will be provided and other resources as relevant.

Weekly homework and weekly quizzes will be 70% of the grade; attendance of Math & Statistics Department Special Lectures will be 5% of the grade; the final will be the remainder. Extra credit will be available throughout the course.