



Mathematical Sciences  
P.O. Box 210025  
Cincinnati, OH 45221-0025

## Numerical Analysis

Autumn 2009 (15-MATH-514-001)

**Time and Place:** MWF 12:00-12:50 PM, Old Chem 804  
**Instructor:** Donald A. French (611C Old Chemistry)  
**Phone:** 556-4039  
**Email:** french@math.uc.edu  
**Office Hours:** M 1-3 PM and by appointment.

**Prerequisites:** Calculus I–IV, Differential Equations, Linear Algebra and maturity/skill in mathematics at an advanced level. It would be wise to have taken Analysis (e.g. 15-MATH-408/409) and, perhaps, be concurrently taking Graduate Analysis (e.g. 15-Math-504/505/506).

You should also seriously consider taking Applied Linear Algebra (15-MATH-555-001) now to prepare for the Winter quarter of Numerical Analysis (15-MATH-515-001).

**Text:** Introduction to Numerical Analysis (2nd edition) by Kendall E. Atkinson.

**Description:** This is the first quarter of a year long sequence that introduces numerical analysis and is at the graduate level. We will cover sections in the first four chapters of the text. Topics will include floating point arithmetic, rootfinding for nonlinear equations, fixed point analysis, stability, interpolation theory, and least squares methods for function approximation. A primary focus is on the use of Taylor's theorem to analyze the methods.

The analysis will be emphasized here instead of computation. We will typically examine carefully chosen model or prototype problems in order to furnish theorems and insight into the behavior of the approximation methods.

**Grading:** There will be two exams;

Midterm: Wednesday, October 28 (In Class)

Final: Monday, December 7, 1:30-3:30 pm.

They will count toward most of the course grade. Homework assignments will also count and will be given every 1-2 weeks. Late homework may not be accepted or be subject to point reductions.

**Lectures:** Class notes are the primary study source. Occasionally, sections in the book will be skipped and supplemented by topics from outside sources.

The information given here is subject to change. Any major changes will be announced in lecture.