

22M:170/22C:170
Numerical Analysis I
(Nonlinear Equations & Approximation Theory)
Fall 2007

Contact/class information

Instructor: Dr. David Stewart
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Office hours: 2:30–3:30pm M, 2:30–3:30pm Tu & 10:30–11:30am W
Class times: 9:30–10:20am MWF
Class location: 110 McLean Hall

You can see me outside the office hours provided it is mutually convenient.

Description

22C:170/22M:170 is the first half of a comprehensive course in numerical analysis. Numerical analysis is what connects continuous mathematics with computers and computing. Numerical analysis is about how to solve equations, compute derivatives and integrals, and solve differential equations. The difference is that computers can only store real numbers to a finite (in fact, very limited) number of decimal (or binary) places. Whenever a computation is done, there is almost always some error in the result.

In this course you will learn **not** to ask

Is the answer (exactly) correct?

Instead you will learn to ask

How big is the error?

Textbook

Introduction to Numerical Analysis by K. Atkinson, J. Wiley and Sons, 2nd Edition (1989). This course covers the first five chapters. 22C:171/22M:171 covers the chapters six through nine.

Syllabus

- Rounding error and floating point arithmetic
- Solving equations
- Interpolation
- Approximating functions
- Numerical integration
- Ordinary differential equations

Assessment

There will be two in-class exams (20% each), homework assignments (30% total) which may include some programming, and a programming assignment (30%). There may also be ungraded homework assigned during the course. Familiarity with MATLAB will be useful during the course.

Notes

1. **Course plan:** The course plan may be modified during the semester. Such modifications will be announced in advance during class periods; the student has responsibility for keeping up with such changes. You should also make a habit of reviewing the ICON web page for this course, which is accessible via: ICON <http://icon.uiowa.edu/> This page will have homework details and other information posted to it as the class progresses.
2. **Administration:** The administrative home of this course is The Department of Mathematics in the College of Liberal Arts and Sciences: offices are in 14 McLean Hall (MLH). You can contact the chair of the department through the Departmental Secretary at 14 MLH or by calling 335-0714. Since the administrative home of this course is the College of Liberal Arts and Sciences, which governs academic matters relating to the course such as add/drop deadlines, second-grade-only option, issues concerning academic fraud or academic probation, and how credits are applied for various CLAS requirements. Please keep in mind that different colleges might have different policies. If you have questions about these or other CLAS policies, visit your academic advisor or 120 Schaeffer Hall and speak with the staff. The CLAS Academic

Handbook is another useful source of information on CLAS academic policy: www.clas.uiowa.edu/students/academic_handbook/index.shtml

3. **Disabilities:** Please let your instructor know if you have a disability that requires special arrangements. I need to hear from anyone who has a disability which may require some modification of seating, testing or other class requirements so that appropriate arrangements can be made. Please see me after class or during my office hours.
4. **Suggestions & complaints:** Students have the right to make suggestions or complaints and should first visit with the instructor, then with the course supervisor if appropriate, and next with the departmental DEO. All complaints must be made within six months of the incident. http://www.clas.uiowa.edu/students/academic_handbook/ix.shtml#5
5. **Sexual Harassment:** Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. Visit <http://www.sexualharassment.uiowa.edu/> for definitions, assistance, and the full policy.