

MATH 4640 AG, AU, Q: FALL 2007

Numerical Analysis I.

Classes: TR 8:05-9:20, Instructional Center 215.
Professor: Luca Dieci, Skiles 215, ph. (404) 894-9209
e-mail is best: dieci@math.gatech.edu
Office Hours: TR 9:30-11:00 or by appointment.
Textbook: “An Introduction to Numerical Analysis,”
by K. Atkinson, 2nd Edition, J. Wiley & Sons.
Prerequisites: Calculus Sequence, Linear Algebra, **Matlab**.

This class is aimed at senior undergraduate and beginning graduate students who want to learn the basics of numerical techniques. We will cover as much as possible of Chapters 1-4 (perhaps 5) and 8 of the book: Finite precision issues, solution of linear systems, interpolation and least squares, root-finding, possibly integration rules. Chapter 7 is assumed to be known.

Grading will be based on **5 HW Assignments**, **2 in class Exams**, and the **Final Exam**. In class Exams will last 50 minutes.

Each **HW Assignment** will count **8%** of your final grade, each in class **Exam** will count **15%**, and the **Final Exam 30%**. You **must take the Final** in order to pass the class. All Exams will be “closed book”, “closed notes”. You will be notified if you will be able to bring with you a one page 8.5×11 “cheat sheet” with anything you want written on it, both sides.

Communication on changes in schedule, or other relevant class information will be posted on my web page. Go to <http://www.math.gatech.edu/~dieci> and follow the class link.

Assignments. These will consist of a mix of theoretical (1/3 to 1/2) and computational (2/3 to 1/2) questions. For the computational part, **Matlab** is the required computational platform. You will have one week to work on your assignment, but I will accept it only on the collection days (or earlier).

HW and Exams dates.	
Given To You	Due Back
8/30	9/6
9/13	9/20
10/4	Exam # 1
10/16	10/23
11/1	11/8
11/15	Exam # 2
11/27	12/4
12/13	Final Exam, 2:50-5:40

Remember that all students at Georgia Tech are expected to adhere to the Honor Code. See

<http://www.deanofstudents.gatech.edu/integrity/policies.php>

In particular, I expect that you will do all HW assignments on your own. Transgressors will receive a grade of 0 on the assignment and will be reported to the Office of Student Integrity.

MATH-4640 AG, AU, Q, RCC and CS-4642 A. SPRING 2010

Numerical Analysis I.

Classes: TR 9:35-10:50, Sustainable Education 110.
Professor: Luca Dieci, Skiles 215, ph. (404) 894-9209
e-mail is best: dieci@math.gatech.edu
Office Hours: TR 12:00-1:00 or by appointment.
Textbook: “Scientific Computing, An introductory survey,”
by Michael T. Heath, 2nd Edition, McGraw–Hill.
Prerequisites: Calculus Sequence, Linear Algebra, **Matlab**.

This class is aimed at senior undergraduate and beginning graduate students who want to learn the basics of numerical techniques. We will cover most of Chapters 1, 2, 3, 5, 6, 7, 8 and bits from Chapter 11 of the book: Finite precision issues, solution of linear systems, linear least squares, solution of nonlinear equations, optimization, interpolation, differentiation and integration.

Grading will be based on **4 HW Assignments**, **2 in class Exams**, and the **Final Exam**. In class Exams will last about 50 minutes.

Each **HW Assignment** will count **10%** of your final grade, each in class **Exam** will count **16%**, and the **Final Exam 28%**. You **must take the Final** in order to pass the class. All Exams will be “closed book”, “closed notes”, but you will be allowed to bring with you a one page 8.5×11 “cheat sheet” with anything you want written on it, both sides. Unless instructed otherwise, calculators will not be allowed on the Exams. Communication on changes in schedule, or other relevant class information will be posted on my web page. Go to <http://www.math.gatech.edu/~dieci> and follow the class link.

Assignments. These will consist of a mix of theoretical (1/3 to 1/2) and computational (2/3 to 1/2) questions. For the computational part, **Matlab** is the required computational platform. You will have at least one week to work on your assignment, which should be turned in on the collection days below (or earlier).

HW and Exams dates.	
Given To You	Due Back
2/2	2/9
2/18	Exam # 1
2/23	3/2
3/18	4/1
4/15	4/22
4/22	Exam # 2
5/6	Final Exam, 8:00-10:50

All students at Georgia Tech are expected to obey the Honor Code. See

<http://www.deanofstudents.gatech.edu/osi/plugins/content/index.php?id=46>

People caught cheating will be given a grade of 0 and reported to the Office of Student Integrity.

Math 4640 Numerical Analysis I Course Information (Spring 2012)

Time: M W, 15:05-16:25

Place: Skiles 169

Text book:

Kendall E. Atkinson, *An Introduction to Numerical Analysis*, ISBN 0-471-62489-6.

* Finite precision and accumulation of round-off errors. Introduction to approximation theory Function norms and errors Polynomial and piecewise polynomial interpolation Bases for polynomial spaces, Lagrange formula

* Introduction to numerical integration Trapezoidal, midpoint, and Simpson's rules General Newton-Cotes formulas Error and convergence Composite rules Orthogonal polynomials, Gauss quadrature rules, error and convergence Change of intervals, singular integrals Multiple integrals

* Introduction to the solution of nonlinear systems of equations Bisection and secant method General fixed point methods, convergence Newton and quasi-Newton methods Newton's method for systems

* Introduction to the solution of linear systems of equations by direct and iterative methods Gaussian elimination and pivoting: PLU factorization, norms, condition numbers and errors the Jacobi and Gauss-Seidel iterative methods, convergence of the Jacobi method QR factorization

* Numerical methods for ODEs.

Instructor:

Dr. Yingjie Liu

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Office Hours:

M W, 16:25-17:30

Homework:

Homeworks will be assigned once every couple of weeks and they must be turned in on time.

Grading:

Homeworks 50%, Final 50%.

Homework 1:

[part 1/2](#), [part 2/2](#), due 2/8.

Homework 2:

[part 1/2](#), [part 2/2](#), due 2/22.

Homework 3:

[HW3](#), due 3/14.

Homework 4:

[part 1](#), [part 2](#), due 4/11.

Homework 5:

[HW5](#), due 4/25.

[Answer Key](#)

[Final exam](#), due 5/02/2012.