

MAT/CSC 381 - Spring 2014
Introduction to Numerical Methods
Classroom: MCC 117A
Monday 5:30 – 8:15 p.m.

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Textbook: Numerical Methods (4th edition), Faires and Burden
Prerequisites: MAT 122 and CSC 116

Catalog Description: This course looks into the modeling of mathematical concepts on a computer. Algorithms will be discussed and implemented which find roots of equations, give polynomial approximations to discrete data, approximate integrals and derivatives, solve ordinary differential equations and solve linear systems of equations.

Course Overview: In engineering and other scientific areas, various mathematical problems arise which need to be solved. However, not all problems have solutions that are easy to find by hand or in a reasonable amount of time. The use of a computer in solving these problems is introduced. But, most of these engineering problems involve continuous mathematical models whereas a computer is only capable of a finite number of computations. Hence, finite approximation methods which may be implemented on a computer must be developed that give good and reasonable answers to the continuous problems. Numerical Analysis is the systematic and mathematical study of the errors in using such methods. For this class, we will consider only the design and programming of good algorithms and leave much of the detailed study for MAT/CSC 481.

Course Goals: This course will provide the following to the student:

1. A general understanding of a wide range of numerical methods to solve roots of equations, polynomial approximations, numerical differentiation/integration, ordinary differential equations, and linear systems of equations.
2. Knowledge and ability to identify and apply the appropriate numerical methods for a problem based on convergence speed and numerical stability.

Academic Dishonesty: I expect that all work you produce for this course will be your own original work. If you plagiarize any material for your written work, presentations, code, or final exam, it will result in a failure of this entire course.

ADA Statement: If you need special accommodations due to learning, physical, psychological, or other disabilities, please contact Dr. Buddy Wagner in the Counseling and Career Development Center. He may be reached by phone at (601) 925-3354 or by mail at P.O. Box 4013, Clinton, MS 39058

Assignments and Evaluations

Homework and Programming Assignments: 150 points
Oral Presentations and Class Participation: 100 points
Mid-Term Exam: 250 points
Analysis Papers: 250 points
Final Exam: 250 points

On-line Resources:

1. Code examples: <http://www.math.yzu.edu/~fares/Numerical-Methods>