

Instructor: Dr. Talitha Washington  
Contact Info: Office: KC 318; Phone: 488-2213; Email: tw65@evansville.edu  
Office Hours: MWF 8:15-9, 10-12; Tu 8:15-10 and by appointment  
Required Texts: *Numerical Analysis*, 8th Ed., Burden and Faires  
Prerequisite: Math 222 or equivalent and Engineering 122 or Computer Science 210 or equivalent

**Course Description:** Math 373 deals with the design, implementation, and analysis of algorithms for finding numerical solutions to mathematical problems. Major topics include error analysis, solutions of equations in one variable, interpolation and polynomial approximation, numerical differentiation and integration, initial value problems for ordinary differential equations, and solutions of linear systems of equations.

**Course Learning Objectives:** It is expected that students will:

- gain factual knowledge about numerical approximation techniques
- acquire methods to solve mathematical problems numerically
- learn fundamental principles and theory of numerical analysis
- learn to apply course material to enhance understanding
- develop specific skills and competencies in mathematics through oral and written work

**Methods of Instruction:** Typical class periods will include a discussion of homework problems and an introduction of new material, although not always in that order. You are expected to read the text and complete all assigned homework. The computer algebra system **Matlab** will be used for classroom investigations and daily homework.

**Grading:** The weights in determining your final grade are as follows:

- 45% – Homework Assignments
- 15% – Exam 1 on Friday, February 9
- 15% – Exam 2 on Friday, March 23
- 25% – Final Exam on Tuesday, May 8, 10:15 AM

The usual course grades apply. (ex:  $80 \leq x < 83 \rightarrow B^-$ ,  $83 \leq x < 87 \rightarrow B$ ,  $87 \leq x < 90 \rightarrow B^+$ ) Changes to Exam dates will be announced in class.

**Course requirements and policies:**

**a. Calculators:** You may use a graphing calculator on all exams. If you don't already have one, consider purchasing a TI-83+ or TI-84+. Calculators with symbolic algebra capability (e.g. TI-89 or TI-92) will not be allowed during exams.

**b. Attendance:** You are expected to attend class on time every day. However, if you miss a day, it is up to you (not me, or your classmates) to catch up and learn what you have missed.

**c. Homework:** Assignments will be made weekly and posted on *Blackboard*. Late homework will be marked down by 10% for each day (or portion of a day) late; solutions to homework problems that have already been gone over in class will not be accepted. While it is permissible to discuss the problems with classmates, the submitted homework must be your own. Some basic programming in Matlab may be required.

**d. Make-ups:** Make-up exams will be given only in extreme circumstances that are documented university approved excused absences, and only if I am aware of the circumstances prior to the exam. In particular, make-ups will never be given to accommodate travel plans.

**e. Honor Code:** It is expected that you are familiar with and will comply with the terms of the University's Academic Honor Code. Giving or receiving any type of aid on exams is strictly prohibited and will result in an F.

**f. Accessibility:** Please let me know immediately if you have a learning or physical disability requiring accommodation. For more information, contact the Office of Counseling and Health Education at 488-2663.

**Tentative Outline**

Review of Calculus (1.1)

Errors and computer arithmetic (1.2)

Algorithms and convergence (1.3)

Root finding (2.1, 2.2, 2.3, 2.4, 2.6)

Interpolation methods (3.1, 3.2, 3.4)

Numerical differentiation and integration (4.1, 4.2, 4.3, 4.4, 4.5)

Initial value problems for ODE's (5.1, 5.2, 5.3, 5.4)

Linear systems (6.1, 6.2, 6.3, 6.4, 6.5)