

## ***CS 4513: Numerical Mathematics: Analysis***

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**Required Course:** Elective

**Course Number:** CS 4513

**Course Name:** Numerical Mathematics: Analysis

**Credit Hours:** 3

**Lecture Hours:** 3

**Lab Hours:** 0

**Instructors:** Dr.Xu Zhang

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**Book Title(s):** Numerical Analysis, 10<sup>th</sup> Edition

**Book Author(s):** R.Burden, J.Faires, and A.Burden

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**Course Description:** Machine computing, algorithms, and analysis of errors applied to interpolation and approximation of functions solving equations and systems of equations; discrete variable methods for integrals and differential equations.

**Course Prerequisites:** MATH 2233(Differential Equations) and MATH 3013(Linear Algebra), each with a grade of “C” or better.

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### **Course Topics:**

- Mathematical Preliminaries and Error Analysis
- Solutions of Equations in One Variable
- Interpolation and Polynomial Approximation
- Numerical Differentiation and Integration
- Initial-Value Problems for Ordinary Differential Equations
- Direction Methods for Solving Linear Systems
- Iterative Techniques in Matrix Analysis