Introduction to Numerical Analysis (Math 4533-001) (CRN#14384)
Spring 2024, TTh 3:30PM–4:45PM

Professor: Dr. Jeongho Ahn   Office: CSM 118

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Textbook: Elementary Numerical Analysis (3rd edition) by Kendall Atkinson & Weimin Han, John Wiley & Sons, Inc.

Prerequisites: Math 2214 (Calculus II) and CS 2173 (Introduction to Structured Programming) or CS 2183 (Structured Programming I)

Course Description: Algebraic, transcendental, ordinary and partial differential equations, finite differences, and integral equations. Numerical integration, error analysis, and/or other topics of numerical analysis utilizing high speed computer techniques

Student learning outcomes for MATH 4533, Numerical Methods:

students will be able to:

- Understand how we use computers to solve mathematical problems (e.g., physics, chemistry, biology, engineering, economics).

- Develop understanding of the Talyor series to set up approximate polynomials.

- Learn error analysis.

- Use the bisection method, the secant method and Newton's method to solve nonlinear equations.

- Understand the interpolation theory and find polynomial interpolants, using the Lagrange interpolation and Newton's divided difference.

- Learn the Chebyshev interpolation, a near-minimax approximation method and the least square approximation.

- Learn the trapezoidal and Simpson rule to evaluate the Riemann definite integrals.

- Develop understanding of the Gaussian numerical integration.

- Find the forward and backward difference formulas and derive the error formulas.

- Solve linear systems using the direct methods or indirect methods.

B.S. Mathematics program learning outcome supported by MATH4403: upon completion of the B.S. Mathematics program, students will be able to

- demonstrate the ability to think analytically to decipher challenging problems, utilize appropriate mathematical practices to construct mathematical arguments to solve them, and interpret their solutions.

- demonstrate the ability to construct logical arguments and write formal mathematical proofs to establish the truth of mathematical statements.

- demonstrate the ability to communicate mathematics effectively.

Grading

- In-class tests:30%   Homework assignments:50%   Final exam:20%

- Grades are assigned on the following basis:

	A	B	C	D	F
From	90	80	70	60	0
To	100	89	79	69	59

Homework Assignments

- You will do homework assignments which may include some programming **every other week**.

- The programming will be done in **Scilab.** You may download it from their Home Page.

Tests & Final Exam

- You will take **two** in-class tests.

- The **final exam** is comprehensive and may include all materials covered during the semester.

- **The Final Exam Schedule: May 3 (Friday), 10:15AM–12:15PM**

Class Policies

1. Attendance: As stated in the student handbook, "Students should attend every lecture, recitation, and laboratory session of every course in which they are enrolled." Students who have more than **five** unexcused absences will be assigned an "F" for this course. When possible, you should give advanced notice of absences. When you miss more than four classes, you must come to see me.

2. Academic Dishonesty: When you take a test, you are not allowed to communicate in any fashion with anyone except myself. In addition, you are not allowed to view another student's work, share paper or calculators.

3. Demeanor: If you distract other students from studying during class, you will be asked to leave class. If it is the second time, you will be administratively dropped. Please turn your cellular phone off before you come to class.

4. Make-ups: There is no make-up of exams, including the final, if I am not notified in advance.

Additional Notes

- The course plan may be modified during the semester. Such modifications will be announced during class periods; the students have responsibility for keeping up with such changes.

- Students who require academic adjustments in the classroom due to a disability must first register with ASU Access & Accommodation Services. Following registration and within the first two weeks of class, please contact me to discuss appropriate academic accommodations. Appropriate arrangements can be made to ensure equal access to this course.

- **Last Day to Drop or Withdraw from the University: April 5 (Friday)**

Title IX (Sexual Harassment Discrimination)

- Visit the ASU website: https://www.astate.edu/a/affirmative-action/title-ix/

Dr. Jeongho Ahn's Schedule for Spring 2024

	Monday	Tuesday	Wednesday	Thursday	Friday
11:00	Office Hours				Office Hours
12:00	Diff. Eqs Math 4403 CSM 131		Diff. Eqs Math 4403 CSM 131		Diff. Eqs Math 4403 CSM 131
1:00			Office Hours		
2:00	Cal III Math 3254 HSS 2063	Cal III Math 3254 HSS 2063	Cal III Math 3254 HSS 2063	Cal III Math 3254 HSS 2063	
3:30 −4:45		Intro. to N. A. Math 4533 CSM 209		Intro. to N. A. Math 4533 CSM 209	

**If the above office hours conflict with your schedule,
please email me to arrange a meeting time**