

# Math 164 –Introduction to Numerical Analysis

## Fall 2024

### Course Information

Lectures: Tue and Thu 11:10am – 12:30pm at DGH 112

Instructor: Christopher Kim, Assistant Professor, Mathematics (christopher.kim@howard.edu)

Office Hours: Tue and Thu 10:00 – 11:00am at Annex III 218

Course Textbook: *A Compact Compendium in Numerical Analysis* by Roberto De Leo (online textbook)

Lecture notes and Python code will be shared at <https://github.com/chrismkkim/Howard-Math164>

### Grading Policy

Overall grading scheme: Your grade will be broken down as 50% for weekly homework, 30% for two take-home midterms, and 20% for final take-home exam.

Weekly homework: 50%

Two take-home midterms: 30% (15% each)

Final take-home exam: 20%

Homework: Your solution to each week's homework problems must be uploaded to Canvas at the beginning of class on the due date. Two of the lowest homework score will be dropped. For this reason, late homework will in general not be accepted. If you have medical or other reasons, please contact the instructor.

Letter grades follow the traditional scale:

A: 90 – 100%, B: 80 – 89%, C: 70 – 79%, D: 60 – 69%, F: 0 – 59%

### Topics to be covered

1. Floating Point systems.
2. Iterative methods to solve equations.
3. Linear Systems of Equations.
4. Eigenvalues and eigenvectors of a symmetric matrix.
5. Optimization.
6. Nonlinear Systems of Equations.
7. Polynomial interpolation.
8. Integration.
9. Initial and boundary value problems for ODEs.

### Tentative Syllabus

- Week 1: Introduction to Scientific Computing. Floating point. Truncation and algorithm errors.
- Week 2: Taylor series and approximations, Iterative methods
- Week 3 through 5: Iterative methods, Linear Systems.
- Week 6 & 7: Nonlinear Systems, Optimization.
- Week 8: Eigenvalues and eigenvectors
- Week 9 & 10: Interpolation and Integration.
- Week 11 & 12: ODEs.
- Week 13: Some example of PDEs.
- Week 14: Review.

## **Collaboration**

**If you use ChatGPT for your work, you must turn in the entire dialogue history.** You are encouraged in general to work with study partners and also to collaborate on homework. On the other side, you must write your solutions **yourself, in your own words**, and **you must list all collaborators and outside sources of information**. It is a serious violation of academic integrity to copy an answer without attribution.

## **Academic Code of Student Conduct**

(please see Howard University handbook) No copying, unauthorized use of calculators, books, or other materials, or changing of answers or other academic dishonesty will be tolerated. Cheating will not be tolerated. Anyone caught cheating will receive an F for the course and may be expelled from the university.

## **Grievance Procedure**

If you have any problems with the policies or rules of this course, discuss your concerns with your instructor. If you are still unable to come to a satisfactory arrangement, you may contact the Director of Undergraduate Studies, Dr. [Jill McGowan](#), and, if still unsatisfied, the Chair of the Department, Dr. [Bourama Toni](#).

## **Americans with Disabilities Act**

Howard University is committed to providing an educational environment that is accessible to all students. In accordance with this policy, students in need of accommodations due to a disability should contact the Office of the Dean for Special Student Services (202-238-2420, [bwilliams@howard.edu](mailto:bwilliams@howard.edu)) for verification and determination of reasonable accommodations as soon as possible after admission and at the beginning of each semester as needed.

## **Statement on Sex and Gender-Based Discrimination, Harassment and Violence**

Howard's Policy Prohibiting Sex and Gender-Based Discrimination, Sexual Misconduct and Retaliation (aka, the Title IX Policy) prohibits discrimination, harassment, and violence based on sex, gender, gender expression, gender identity, sexual orientation, pregnancy, or marital status. With the exception of certain employees designated as confidential, note that all Howard University employees - including all faculty members - are required to report any information they receive regarding known or suspected prohibited conduct under the Title IX Policy to the Title IX Office ([TitleIX@howard.edu](mailto:TitleIX@howard.edu) or 202-806-2550), regardless of how they learn of it. For confidential support and assistance, you may contact the Interpersonal Violence Prevention Program (202-836-1401) or the University Counseling Service (202-806-7540). To learn more about your rights, resources, and options for reporting and/or seeking confidential support services (including additional confidential resources, both on and off campus), visit [titleix.howard.edu](http://titleix.howard.edu).