MATH 1070: Numerical Mathematical Analysis, Fall 2021

Instructor: Catalin Trenchea, Thackeray 606, 624-5681, trenchea@pitt.edu, www.pitt.edu/~trenchea
Office hours: MW 3:00-4:00 and by appointment (also via zoom).
Lecture: MWF 12:00-12:50, G27 Benedum Hall
<div align="center">or virtually - Zoom (meeting ID info by email/Canvas Announcement)</div>

Class web page: www.pitt.edu/~trenchea/Math1070_Fall_Semester_2021.html
Textbook: *Elementary Numerical Analysis*, 3rd edition, by K. Atkinson and W. Han.
Prerequisites: Single variable calculus. Knowledge of differential equations will be useful, but not required.
Content: This course is an introduction to modern numerical methods. Topics include polynomial and spline interpolation, numerical integration and differentiation, numerical solution of nonlinear equations and ordinary differential equations. Our goal will be to understand how and when the methods work. The concept of numerical error will be used to quantify the accuracy of approximation. We will also study the stability and the efficiency of the algorithms.
Topics to be covered:

- Chapter 1: Taylor polynomials

- Chapter 2: Computer representation of numbers, error

- Chapter 4, 4.1-4.3: Interpolation

- Chapter 5: Numerical integration and differentiation

- Chapter 3: Rootfinding

- Chapter 4, 4.4-4.7: Approximation of functions (if time permits)

- Chapter 8: Numerical solution of differential equations (if time permits)

Course Delivery: During the first 2 weeks classes, August 17 to September 10 (2021), all instruction will be conducted remotely. Typically this means your instructor will hold virtual class meetings through Zoom at the scheduled class time, and the links to join these synchronous meetings will be posted in Canvas. The class meetings will be recorded, uploaded to Panopto, and made available for viewing through Canvas.
Tutoring: The Mathematics Department offers a free tutoring service. The Math Assistance Center (MAC) is located on the second floor of the O'Hara Student Center. Tutoring services and tutoring hours will be posted outside the MAC as well as on the web at MAC.

Homework: Written homework and several computational projects will be assigned. Late homework will be accepted only by special permission of the instructor. Computer assignments will use Matlab, software by The MathWorks. The Matlab language provides extensive library of mathematical and scientific function calls entirely built-in. An introduction to Matlab will be given at the beginning of the course. A set of matlab codes implementing the numerical algorithms is provided by the authors of the text and is available on the class web page. The computer assignments will utilize this software and will emphasize analyzing the behavior of the algorithms rather than coding them.
Homework policies: Students are required to complete the homework problems; very few students

can learn this material without constant practice. Students are welcome to work together on homework. However, each student must turn in his or her own assignments, and no copying from another student's work is permitted. Deadline extensions for homework will not be given. Please feel free to come ask me questions about homework and other course material during office hours or to contact me to schedule alternative appointments. **Your questions are always welcome**.

Exams: Two exams will be given in class during the semester, at approximately five week intervals. A comprehensive final exam will be given during finals week. The final exam will give greater emphasis on material not previously tested by the midterm exams.

Exams policy: Since many assessments could be administered online, proctoring exams might be done via ZOOM and a video connection will be required.

Grading Policy: The total of the two midterm exams will count 35% of the final grade. The homework will count 35% and the final exam will count 30%.

Disability Resource Services: If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, 412-648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Academic Integrity: The University of Pittsburgh Academic Integrity Code is available at "Academic Integrity: Avoiding Plagiarism and Understanding Research Ethics: Avoiding Plagiarism". The code states that "A student has an obligation to exhibit honesty and to respect the ethical standards of the academy in carrying out his or her academic assignments." The website lists examples of actions that violate this code. Students are expected to adhere to the Academic Integrity Code, and violations of the code will be dealt with seriously.

This is especially notable during this period . Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity will incur a minimum sanction of a zero score for the quiz, exam or paper in question. Additional sanctions may be imposed, depending on the severity of the infraction.

Please note, in particular, that Pitt has a data sharing arrangement with Chegg.com that enables us to identify instances in which Chegg.com has been used to cheat on assessments. Consequences of being caught in this academic integrity violation have included zero scores on assessments and F grades for the course.

Health and Safety: In the midst of this pandemic, it is extremely important that you abide by public health regulations and University of Pittsburgh health standards and guidelines. While in class, at a minimum this means that you must wear a face covering and comply with physical distancing requirements; other requirements may be added by the University during the semester. These rules have been developed to protect the health and safety of all community members. Failure to comply with these requirements will result in you not being permitted to attend class in person and could result in a Student Conduct violation. For the most up-to-date information and guidance, please visit coronavirus.pitt.edu and check your Pitt email for updates before each class.

Diversity and Inclusion: The University of Pittsburgh does not tolerate any form of discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, genetic

information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity or other factors as stated in the University's Title IX policy. The University is committed to taking prompt action to end a hostile environment that interferes with the University's mission. For more information about policies, procedures, and practices, see: https://www.diversity.pitt.edu/civil-rights-title-ix-compliance/policies-procedures-and-practices.

Classroom Recording: To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities not already recorded by the instructor, without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use. Lectures could be recorded by the instructor, and this may include student participation. Students are not required to participate in the recorded conversation. The recorded lecture may be used by the faculty member and the registered students only for internal class purposes and only during the term in which the course is being offered. Recorded lectures will be uploaded and shared with students through Canvas.

Copyright: Some of the materials in this course may be protected by copyright. United States copyright law, 17 USC section 101, et seq., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials. See the Library of Congress Copyright Office and the University Copyright Policy.