MATH 5610/6860, Introduction to Numerical Analysis, Fall 2019

Class Meetings: MTWF 10:45–11:35 AM in BU C 305

Instructor: Dr. Dong Wang (dwang@math.utah.edu)

Office Hours: TF 9:30 – 10:30 AM in LCB 202, or by appointment

Prerequisite Information: In order to be successful in this class you need to have a thorough grasp of Calculus, particularly Calculus of several variables, you need to understand basic linear algebra, and you need to have some programming ability.

Canvas: Canvas will be used for posting course announcements, homework assignments, grades, files and any relevant supplementary material. You are also welcome to make use if the Canvas discussion board to discuss course problems or topics. You can access the Canvas page through CIS or by logging in at utah.instructure.com. Students should check the Canvas page regularly for course information and resources. Email notifications and correspondence will be sent to the student’s UMail address ([u-number]@utah.edu); this email account must be checked regularly.

Grading: 1 term project (20%), 5 home works (10% each) and 1 final exam (30%). Final course letter grades will be determined as follows: If X is your course percentage weighted according to the above, then

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\begin{align*}
X \geq 90\% & \Rightarrow A, \\
X \geq 85\% & \Rightarrow A-, \\
X \geq 80\% & \Rightarrow B+, \\
X \geq 75\% & \Rightarrow B, \\
X \geq 70\% & \Rightarrow B-, \\
X \geq 65\% & \Rightarrow C+, \\
X \geq 60\% & \Rightarrow C, \\
X \geq 55\% & \Rightarrow C-, \\
X \geq 50\% & \Rightarrow D+, \\
X \geq 45\% & \Rightarrow D, \\
X \geq 40\% & \Rightarrow D-, \\
X < 40\% & \Rightarrow E
\end{align*}
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Final exam: The final exam will be in our regular classroom on Monday, December 9, 2019, 10:30 am–12:30 pm. It will be closed books and notes, no calculators or other electronic devices.

Team Work: I recommend that you form study groups of two or three people and work on the home work and term project together.

Textbook: There will be no textbook assigned.

Notes: Notes will be posted online throughout the course.

Deadlines: For the sake of fairness assignments are due when stated.

Contents: We will cover many basic useful things in numerical analysis. In particular, we will introduce bisection method, fixed point iteration, Newton’s method, nonlinear least square method, numerical differentiation, Gaussian elimination, positive definite matrices, the sensitivity of square systems, least square problems, QR factorization, singular value decomposition, linear programming, simplex method, Karmarkar’s method, eigenvalue problem, perturbation theory, power method, polynomials, Lagrange interpolation, error analysis, piecewise polynomial functions, quadrature, Newton coates formulas, Gaussian quadrature, Adaptive quadrature, continuous least square, Fourier analysis, the fast Fourier transform, wavelets, bivariate interpolation, radial basis functions, and Weierstrass approximation theorem.

Safety Statement: The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safe.utah.edu.