Fall Semester 2019
MATH 4013: Numerical Analysis

Instructor: Dr. Vu Kim Tuan
Time & Location: MW, 5:30 PM - 6:45 PM, Boyd 306
Office: Boyd 325
Office Hours: MW, 4:30 PM-5:30 PM, 6:45 PM-7:45 PM, or by appointment. Please contact me only through campus MyUWG e-mail or in person.
Phone: 678-839-4135
E-mail: vu@westga.edu
Hours Credit: 3 hours
Prerequisites: MATH 2644 Calculus II

Textbook: Richard L. Burden and J. Douglas Faires, *Numerical Analysis, 9th edition,* Brooks/Cole Cengage Learning, 2010, ISBN-13: 978-0-538-73351-9

Course Description: This course gives a satisfactory discussion of main concepts of numerical analysis, such as interpolation and splines, Newton and secant methods for nonlinear equations, numerical differentiation and integration, Runge-Kutta methods for ordinary differential equations.

Topics:
1- Nonlinear equations: the bisection method, fixed-point iteration, Newton's method, secant method, error analysis for iterative methods, accelerating convergence.
2- Interpolation: Lagrange interpolation, Newton interpolation, Hermite interpolation, cubic spline interpolation.
3- Numerical differentiation and integration: Richardson's extrapolation, composite numerical integration, Romberg integration, Gaussian quadrature
4- Ordinary differential equations: Euler method, higher-order Taylor methods, Runge-Kutta methods, multistep methods, stability

Learning Outcomes: It is expected that the student who completes this course will:
1- Be able to use different algorithms to approximate functions, differentiate and integrate, and solve nonlinear equations, ordinary differential equations.
2- Be able to analyze and compare the complexity and stability of involved algorithms.

Tests: There will be three take-home tests worth 100 points each. Take-home tests are supposed to be completed *individually*. The lowest of these test scores will be dropped. You can miss at most one test, and that test will be considered to be the test with the lowest score to be dropped.

Final Exam: The final examination is comprehensive and counts 150 points.

Important Dates: 09/11 :   Test 1, Due 09/16 at 5:30 PM
                                    10/16 :   Test 2, Due 10/21 at 5:30 PM

11/13 :   Test 3, Due 11/18 at 5:30 PM
12/09 :   Final Exam, 5:00 PM – 7:00 PM

Grading: The final letter grade will be determined by the following scale:
A = 315-350,   B = 280-314,   C = 245-279,   D = 210-244, F   = below 210

Homework: This is an important part of the course. At the end of most classes you will be given a list of problems – these are the minimum that you should work on. These problems will not be graded. Practice is important. An important part of each homework assignment is to read the corresponding material in the text. I encourage you to use my office hours if you have any questions. You should make sure to set aside some time every class day to work problems.

Disabilities: Students with documented disabilities (through West Georgia's Disability Services) will be given all reasonable accommodations. Students must take the responsibility to make their disability known and request academic adjustments or auxiliary aids. Adjustments needed in relation to test-taking must be brought to the instructor's attention well in advance of the test (at least one week prior).

Attendance Policy: You are expected to attend every class. Although absences are not penalized, if a class is missed, you are responsible for all material and assignments.

Academic Honesty: You are expected to achieve and maintain the highest standards of academic honesty and excellence as described in the Graduate Catalog. In short, be responsible and do your own work.