Fall Semester 2018

MATH 6503: Numerical Method in Applied Mathematics

Instructor: Dr. Vu Kim Tuan
Time & Location: MW, 5:30 PM - 6:45 PM, Pafford 305
Office: Boyd 325
Office Hours: MW, 4:00 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 2853 Elementary Linear Algebra, MATH 3303 Ordinary Differential Equations

Textbook: Autar K Kaw, Egwu E Kalu, Duc Nguyen, *Numerical Methods with Applications*, www.mathforcollege.com/nm/topics/textbook_index.html
R. L. Burden, J. D. Faires, *Numerical Analysis*, 9th edition, Brooks/Cole, Boston 2011

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: bisection method, Newton method, secant method, false position method.
2- Interpolation: Lagrange interpolation, Newton interpolation, spline method.
3- Numerical differentiation and integration: Simpson rules, Gauss quadrature
4- Ordinary differential equations: Euler method, Runge-Kutta methods, shooting method, finite difference method

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.
3- Be able to use standard software package such as Maple, Matlab, or Mathematica to solve nonlinear equations and ordinary differential equations.

Tests: There will be three take-home tests and one in-class test worth 100 points each. Take-home tests are supposed to be completed *individually*. You can request to drop one take-home test (say Test X). In that case your individual in class Test will cover topics of Test X, and your new Test X score = max{old Test X score, in class Test score}. No make-up exam for missing a test.

Final Exam: No comprehensive final examination.

Important Dates: 9/12 : Take home Test 1, Due 9/24 at 5:30 PM
10/17 : Take home Test 2, Due 10/22 at 5:30 PM
11/7 : Take home Test 3, Due 11/12 at 5:30 PM
12/10 : In class Test 4, 5:00 PM – 7:00 PM

Grading: The final letter grade will be determined by the following scale:
A = 270-300, B = 240-<270, C = 210-<240, 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.