AE/ME 5830 – Applied Computational Methods (Spring 2015)
Tu/Th 11:00 AM – 12:15 PM BCH 213

1. Instructor:
   Dr. Serhat Hosder, 290B Toomey Hall, hosders@mst.edu, Ph: 341-7239

2. Pre-Requisites:
   Comp Sci 1570 or 1970 or 1981; Math 3304; or the consent of the instructor.

3. Catalog Description:
   Detailed study of computational methods for efficient solution of selected fluids, structures, thermodynamics, and controls problems in aerospace and mechanical engineering. Besides basic numerical techniques, topics covered include gradient-based optimization and uncertainty quantification.

4. Course Website:
   Missouri S&T Blackboard System (http://blackboard.mst.edu/webapps/login/)
   Announcements, course slides and documents, handouts, homework etc. will be all posted to the course website on Blackboard, so please check the page regularly.

5. Office Hours: TBD

6. Textbook:

7. Grading:
   Homework 40%, Tests (2) 20% each, Project 20%
   Final letter grade distribution based on the overall points obtained from tests and assignments:
   For graduate students:
   A: 100 - 90  B: 89 – 80  C: 79 – 70  F: Below 70
   For undergraduate students:
   A: 100 - 90  B: 89 - 80  C: 79 - 70  D: 69 - 60  F: Below 59

8. Policy on missing tests and late homework:
   • No make-up test will be given for the missed tests unless the student has a credible, documented excuse on the test date or an emergency, which should be also approved by the instructor (i.e., a report from doctor’s office to document illness, an official document signed by the responsible university personnel for school related activities, etc.)
   • No late homework will be accepted unless the student has a credible excuse approved by the instructor

9. Policy on academic dishonesty: You are encouraged to discuss the homework questions with your fellow classmates, however the final submitted work must be yours. Please refer to page 33 of the Student Academic Regulations handbook (http://registrar.mst.edu/academicregs/index.html) for the details about the university policy on academic dishonesty on graded work (homework and tests).

10. Students with disability: If you have a documented disability and anticipate needing accommodations in this course, you are strongly encouraged to meet with me early in the semester. You will need to request that the Disability Support Services (http://dss.mst.edu) staff send a letter to me verifying your disability and specifying the accommodation you will need before I can arrange your accommodation.

OUTLINE
1. Root Finding  (Notes and Chapters 5-8)
2. Solving System of Linear Equations (Notes and Chapters 9-12)
3. Solving System of Nonlinear Equations (Notes)
4. Gradient-Based Optimization Techniques (Notes and Chapters 13-16)
5. Interpolation and Function Approximation (Notes and Chapters 18-20)
6. Numerical Differentiation and Integration (Notes and Chapters 21-24)
8. Introduction to Uncertainty Quantification Methods (Notes)