Instructor: Ray Y. K. Yang
Room 441 ESB; Tel: 304-293-9365; E-mail: ryang@mail.wvu.edu

Time and Location: 3:00 - 4:15 pm, Tuesday & Thursday; Room 211 ESB.

Prerequisite: A background in elementary differential equations and basic numerical methods is required. Some prior experience in MATLAB is useful but not required.

b) Copy of parts of the draft of *Numerical Methods for Differential Equations*, a book being prepared by the instructor, will be distributed.

Course Outline*:

1. Introduction
   Reviews of Basic MATLAB; Reviews of Relevant Methods for Solving Linear and Nonlinear Algebraic Equations; Deterministic Models and Mathematical Modeling.

2. Methods for Initial-Value Type Ordinary Differential Equations (ODEs)
   Qualitative Theory of ODEs; Multiple-Step Formulas; Predictor-Corrector Methods; Runge-Kutta Methods; Numerical Stability; Methods for Stiff ODEs.

3. Methods for Initial-Value Type Partial Differential Equations (PDEs)
   Qualitative Theory of PDEs; Finite-Difference Methods for Parabolic PDEs; Methods for Non-Dirichlet Boundary Conditions; Other Methods for Parabolic PDEs; Methods for Hyperbolic PDEs.

4. Methods for Boundary-Value Type Ordinary Differential Equations (ODEs)
   Shooting Methods; Finite-Difference Methods; Other Methods.

5. Methods for Boundary-Value Type Partial Differential Equations (PDEs)
   Finite-Difference Methods for Elliptic PDEs; Two-Dimensional Parabolic PDEs. Other methods.

* Presentation of the topics may not follow exactly the same order as listed above.

Assessment:

1. Homework problems/projects: 80%
2. Two-hour final examination: 20%
Books on Reserve in Evansdale Library:


Other Reference Books on Numerical Methods:


Social Justice Statement:

West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services (293-6700).