Instructor: Dr. David S. Gilliam, Math 103, Phone: 742-1400  
Office Hours: 10:00-11:00 AM TT, 3:30-4:30 PM TTh and by appointment 
Textbook: Course notes will be handed out and suggested reading will accompany the notes.

Math 5310

Notation/Functional Analytic Methods
   (a) Function spaces, norms, and some topological considerations
   (b) Fixed points, successive approximations, contraction mappings

Ordinary Differential Equations/Integral Curves of Vector Fields
   (a) Explicit Methods for ordinary differential equations (algorithms and computer algebra systems)
   (b) Initial value problems
   (c) Systems of linear equations (linear algebra and matrices)

Boundary Value Problems/Sturm-Liouville Theory
   (a) Sturm oscillation and separation
   (b) Sturm-Liouville eigenvalue problems and Green’s function
   (c) Generalized Fourier expansions
   (d) Separation of variables (solution of heat, wave and Laplace equations)

Math 5311

Asymptotic and Perturbation Methods, Variational and Optimization Methods
   (a) Regular and singular perturbation methods
   (b) Asymptotic analysis
   (c) Variational principles
   (d) Methods of Rayleigh, Ritz, Weinstein, and Aronszajn
   (e) Optimization methods; Hilbert space methods
   (f) Integral equations and operators

Grade Policy:
There will be homework assignments and a take home midterm and final that will be used to determine your grade. While it is okay (even encouraged) that you study together, the assignments are to be written independently. This means that each student must write their own version of the solution to a problem – I do not want to see the same solution handed in by a block of students.

Important Dates: January 15, Monday, Martin Luther King Jr. day. University holiday; February 21, Wednesday, Last day to declare pass-fail intentions. Last day to drop a course and receive an automatic W; March 10, Saturday, Noon, classes dismissed for spring vacation; March 19, Monday, Classes resume; April 16, Monday, Day of no classes; April 24-30, Tuesday-Monday, Period of no examinations except for make-up exams or scheduled lab exams; April 27, Friday, Last day to drop a course; Friday May 4 from 7:30 a.m. to 10:00 a.m. Period of final exam.

ADA Accommodations and Religious Observance: Any student who, because of a disability, may require special arrangements in order to meet course requirements should contact me as soon as possible to make necessary arrangements. The instructor may request verification of need from the Dean of Students Office. A student who must miss an exam due to observance of a religious holy day must notify the instructor in advance of all such dates no later than the 15th day after the first day of class.