Syllabus for Paul Dawkins Math 3301

This is the order of topics that I hope to follow this semester. Time sometimes gets away from me in this course so I may have to change up this list a little bit in terms of both topics covered as well as order in which they are covered. I will always try to warn you of any changes in the schedule before they happen.

Topic

Basic Concepts
- Definitions
- Direction Fields

First Order Differential Equations
- Linear Differential Equations
- Separable Differential Equations
- Exact Differential Equations**
- Bernoulli Equations**
- Substitutions**
- Intervals of Validity
- Modeling With 1st Order Differential Equations
- Equilibrium Solutions
- Euler's Method

Exam 1 – Tentative Date : February 20, 2019

Second Order Differential Equations
- Basic Concepts
- Real, Distinct Roots
- Complex Roots
- Repeated Roots
- Reduction of Order
- Fundamental Sets of Solutions
- More on the Wronskian
- Nonhomogeneous Differential Equations
- Undetermined Coefficients
- Variation of Parameters
- Mechanical Vibrations

Exam 2 – Tentative Date : March 22, 2019

Laplace Transforms

The Definition
Laplace Transforms
Inverse Laplace Transforms
Step Functions
Solving IVP's with Laplace Transforms
Nonconstant Coefficient IVP's*****
IVP's with Step Functions
Dirac Delta Function
Convolution Integral

Exam 3 – Tentative Date : April 12, 2019

Systems of Differential Equations

Review : Systems of Equations
Review : Matrices and Vectors
Review : Eigenvalues and Eigenvectors
Systems of Differential Equations
Solutions to Systems
Phase Planes
Real, Distinct Eigenvalues
Complex Eigenvalues
Repeated Eigenvalues
Nonhomogeneous Systems ******
Laplace Transforms******
Modeling

Exam 4 – Tentative Date : May 3, 2019

Series Solutions, Higher Order, Boundary Value Problems, Partial Differential Equations

These chapters are not covered in this course. They do present some interesting material however and I'd invite you to check them out.

***** These sections are not on the syllabus and I cover them if I have the time.

****** These sections are not on the syllabus and while I'd like to cover them never have the time.