Syllabus for Paul Dawkins Math 2414

This is the order of topics that I hope to follow this semester. Towards the end of the semester things tend to be a little rushed and I may deviate somewhat from the order listed here so that we can make sure and spend time on topics that may be more important than others.

### Topic

**Integration Techniques**
- Integration by Parts
- Integrals Involving Trig Functions
- Trig Substitutions
- Partial Fractions
- Integrals Involving Roots
- Integrals Involving Quadratics*
- Using Integral Tables
- Integration Strategy
- Improper Integrals
- Comparison Test for Improper Integrals
- Approximating Definite Integrals

Exam 1 – Tentative Date: February 16, 2017

**Applications of Integrals**
- Arc Length
- Surface Area
- Center of Mass**
- Hydrostatic Pressure and Force**
- Probability*

**Parametric Equations and Polar Coordinates**
- Parametric Equations and Curves
- Tangents with Parametric Curves
- Area with Parametric Curves
- Arc Length with Parametric Curves
- Surface Area with Parametric Curves
- Polar Coordinates
- Tangents with Polar Coordinates
- Area with Polar Coordinates
- Arc Length with Polar Coordinates
- Arc Length and Surface Area – Revisited

Exam 2 – Tentative Date: March 10, 2017 – Note that this is the Friday before Spring Break! Do NOT schedule an early spring break!
Series and Sequences
Sequences
Series – The Basics
Series – Convergence/Divergence
Series – Special Series
Integral Test
Comparison/Limit Comparison Test
Alternating Series Test
Absolute Convergence
Ratio Test
Root Test
Strategy for Series
Estimating the Value of a Series**

Exam 3 – Tentative Date: April 6, 2017

Power Series
Power Series and Functions
Taylor Series
Applications of Series
Binomial Series

Vectors
Vectors – The Basics
Vector Arithmetic
Dot Product
Cross Product

Three Dimensional Space
The 3-D Coordinate System
Equations of Lines
Equations of Planes
Quadric Surfaces
Functions of Several Variables***
Vector Functions***
Calculus with Vector Functions***
Tangent, Normal and Binormal Vectors***
Arc Length***
Curvature***
Velocity and Acceleration***
Cylindrical Coordinates
Spherical Coordinates

Exam 4 – Tentative Date: April 27, 2017
* These sections are not on the syllabus and I rarely have the time to cover them
** These sections are on the syllabus and but are only covered if I have the time.
*** These sections are taught in Calc III.