Learning Outcomes - A Process

Big Ideas (goals?):

(And the learning outcomes that will be re-written)

1. Through exploration you will develop and adapt the concept of integration as accumulation. You will synthesize strategies for analyzing situations requiring integration and correctly devise and implement your solutions.

   SLO: You will devise and implement a solution to a an applied problem or series of problems given in a unit project.

   SLO: You will develop a reference book of applied calculus problems showcasing different applications of the integral.

2. Using a variety of media and varied applications students will demonstrate the relevance and substance of approximation in calculus.

   SLO: You will synthesize a strategy for approximating a limit, establishing error bounds and using technology and automate it through a program or algorithm.

   SLO: Given real data and a real world situation requiring integration, you will synthesize the best procedure for approximating the integral while providing general rules for the error bound.

3. Analysis of dynamic systems.

   SLO: Through a scientific paper you will detail your analysis of a dynamic system, develop a reasonable differential equation (or equations) to model it, and produce a suitable solution (or approximation) to your equation.

Little Ideas:

Among the subtopics included in this course you can expect to develop a clear understanding of:

- Graphical, Numerical, Symbolic, and contextual interpretations of the definite integral.
- The First and Second Fundamental Theorems of Calculus and their applications.
- Integration by applying substitution. By parts, and by applying the table of integrals.
- Numerical approximations of integrals and error significance with applications.
- Solutions to applied problems in integration including geometry, physics, economics, and probability.
- Understanding of sequences and series, tests for convergence and their applications through Maclauren and Taylor series.
- Setting up and solving differential equations through a variety of methods including numerical, separation of variables, and Taylor series.
- Analysis through slope fields.
- Solutions to systems of differential equations.