

## Course Content



Broadly speaking, this course covers many of the foundational topics of **integral calculus** which includes methods of evaluating integrals as well as their use in the context of a variety of applications. Additional topics include differential equations and Taylor series which are important tools as you build on your understanding of calculus in later courses.



# Chapter 1

## Learning Targets

The bulk of the course content is represented by the following specific topics which we will call **Learning Targets**. Your goal over the course of the semester is to develop your understanding of these topics and demonstrate that understanding via various assessment tasks – primarily our weekly check-ins. I've organized these topics to generally align with our textbook.

### 1.1 Evaluating Integrals

- I1.** I can evaluate integrals using substitution and integration by parts methods.
- I2.** I can evaluate integrals using additional methods such as partial fractions or trig substitution.
- I3.** I can evaluate integrals when the appropriate method is not prescribed and/or when multiple methods are needed.
- I4.** I can determine whether improper integrals converge and evaluate them if they do.

### 1.2 Applications of Integrals

- A1.** I can use definite integrals to find the area of a region enclosed by multiple curves.
- A2.** I can use definite integrals to find the arc length of a curve.
- A3.** I can use definite integrals to find the volume of a solid of revolution.
- A4.** I can use definite integrals to find the mass and center of mass of an object.
- A5.** I can use definite integrals to represent key quantities in physical applications such as work or pressure.

### 1.3 Differential Equations

- D1.** I can determine whether a function is a solution to a differential equation and explain why the function is or is not a solution.
- D2.** I can apply Euler's Method to generate an approximate solution to an initial value problem and explain the result's meaning in context.
- D3.** I can express real world situations as differential equations, determine any stable or unstable equilibrium solutions, and explain the significance of the equilibrium solutions in context.

## 1.4 Taylor Polynomials and Series

**T1.** I can find the Taylor polynomial for a given function with a specified degree and center.

**T2.** I can identify geometric series find their sum if they converge.

**T3.** I can use the Taylor series of one or more familiar functions to find the Taylor series for a related function.

## Chapter 2

# Mathematical Practice

In addition to specific Calculus topics, we will also develop more general aspects of your mathematical practice including

- Ability to communicate mathematical thinking effectively, including correct use of vocabulary, notation, and mathematical representations.
- Ability to solve complex and unfamiliar problems.
- Ability to use technology effectively.

