

## Syllabus for Math 10250. Elements of Calculus I

**Textbook:** “Calculus: Ideas and Applications” e-book (ISBN 9781119551140), by Alex Himonas and Alan Howard, is required for Math 10250. It also includes the Students’ Solutions Manual.

- **Chapter 0**

- The Real Numbers and the Cartesian Plane (Review)
- Functions (Review)
- Geometric Properties of Functions (Review)
- Linear Functions (Review)
- Quadratic Functions (Review)
- Polynomials, Rational Functions, Power Functions (Review)

- **Chapter 1**

- Limits
- More about Limits and Asymptotes
- Continuity

- **Chapter 2**

- Exponential Functions
- Compound Interest and the number  $e$  Logarithmic Functions
- Natural Logarithm and Applications

- **Chapter 3**

- The Slope of a Graph
- The derivative of a Function
- The Derivative as a Rate
- Differentiability and Linear Approximation
- Derivatives of Logarithms and Exponentials
- Product and Quotient Rules
- Chain Rule
- Implicit differentiation and related rates

- **Chapter 4**

- First Derivative
- Second Derivative Test
- Sketching Graphs
- Optimization and Applications
- Applied Optimization Problems

- **Chapter 5**

- The Indefinite Integral
- Integration by Substitution
- Integration by Parts and Partial fractions
- Area and the Definite Integral
- The Fundamental Theorem of Calculus
- Computing Definite Integrals, Areas, and Averages
- Numerical Methods

- **Chapter 6**

- Consumer and Producer Surplus
- Continuous Income Streams