ANALYSIS 1
First Semester 2021/2022

Instructor and Contact Information
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A. OVERVIEW OF THE COURSE

Calculus is considered to be one of the greatest intellectual creations of all time. It has been a central factor in expanding our knowledge of the universe. It is the key to analyzing systems that **change**. Because change is fundamental to every conceivable human activity, the study of change is essential to everyone's intellectual development. We need calculus to understand our world.

B. COURSE CONTENT

1. **Review**
   1.1. Functions
   1.2. Inverse Functions
   1.3. Trig Functions
   1.4. Solving Trig Equations
   1.5. Exponential Functions
   1.6. Logarithm Functions
   1.7. Exponential and Logarithm Equations
   1.8. Common Graphs
2. **Limits**
   2.1. Tangent Lines and Rates of Change
   2.2. The Limit
   2.3. One-Sided Limits
   2.4. Limit Properties
   2.5. Computing Limits
   2.6. Infinite Limits
   2.7. Limits At Infinity
   2.8. Continuity
   2.9. The Definition of the Limit
3. **Derivatives**
   3.1. The Definition of the Derivative
   3.2. Interpretation of the Derivative
   3.3. Differentiation Formulas
   3.4. Product and Quotient Rule
   3.5. Derivatives of Trig Functions
   3.6. Derivatives of Exponential and Logarithm Functions
   3.7. Derivatives of Hyperbolic Functions
   3.8. Chain Rule
   3.9. Higher Order Derivatives
4. **Applications of Derivatives**
   4.1. Rates of Change
   4.2. Critical Points
   4.3. Minimum and Maximum Values
   4.4. Finding Absolute Extrema
   4.5. The Shape of a Graph, Part I
   4.6. The Mean Value Theorem
   4.7. Optimization Problems
   4.8. L'Hospital's Rule and Indeterminate Forms
   4.9. Linear Approximations
   4.10. Differentials
5. **Integrals**
   5.1. Indefinite Integrals
   5.2. Computing Indefinite Integrals
   5.3. Substitution Rule for Indefinite Integrals
   5.4. Area Problem
   5.5. Definition of the Definite Integral
   5.6. Computing Definite Integrals
   5.7. Substitution Rule for Definite Integrals
6. **Applications of Integrals**
   6.1. Average Function Value
   6.2. Area Between Curves
   6.3. Volumes of Solids of Revolution / Method of Rings
   6.4. Volumes of Solids of Revolution / Method of Cylinders
   6.5. More Volume Problems
   6.6. Work