

## Hunter College of The City University of New York

**MATH 351 MATHEMATICAL ANALYSIS I 3 hrs, 3 cr.**

**Textbook:** "Principles of Mathematical Analysis" by Walter Rudin, McGraw-Hill

### **Basic Topology**

- Finite, Countable, and Uncountable Sets
- Metric Spaces
- Compact Sets
- Perfect Sets

### **Numerical Sequences and Series**

- Convergent Sequences
- Subsequences
- Cauchy Sequences
- Upper and Lower Limits
- Some Special Sequences
- Series
- Series of Nonnegative Terms
- The Number  $e$
- The Root and Ratio Tests
- Power Series
- Summation by Parts
- Absolute Convergence
- Addition and Multiplication of Series
- Rearrangements
- Exercises

### **Continuity**

- Limits of Functions
- Continuous Functions
- Continuity and Compactness
- Continuity and Connectedness
- Discontinuities
- Monotonic Functions
- Exercises

### **Differentiation**

- The Derivative of a Real Function
- Mean Value Theorems
- The Continuity of Derivatives
- L'Hospital's Rule
- Derivatives of Higher Order
- Taylor's Theorem
- Differentiation of Vector-valued Functions