1. Syllabus

- Topic: Multivariable Analysis, Differentiation, Integration

- Goal: Introduce multivariable analysis tools, techniques, and intuition

1.1 Prerequisites

- MAT 127A or equivalent: Real numbers, sequences, series, and continuous functions

- MAT 127B or equivalent: Derivatives, integrals, sequences of functions, and power series

1.2 Lecture, Discussion, and Office Hours

- Lecture: M, W, F 10:00 am - 11:40 am; Young Hall 194

- Discussion: T 10:00 am - 11:40 am; Wellman Hall 212

- Office Hour: W 3:00 pm - 4:00 pm; Math Science Building 3151

1.3 Topics to cover

- Metric spaces. Norms with examples from $\mathbb{R}^n$.

- Sequences, limits, and completeness.

- Open, closed, and connected sets.

- Compact sets. Heine-Borel theorem.

- Continuous functions on metric spaces and $\mathbb{R}^n$.

- Derivatives of functions of several variables. Partial derivatives.

- Continuously differentiable functions.

- Higher order partial derivatives.

- Chain rule.

- Inverse function theorem.

- Definition of the Riemann integral of functions of several variables over a rectangle.

- Statement of the Lebesgue condition.

- Iterated integrals and the Fubini theorem.

- The Riemann integral over a bounded set.

- Properties of the integral.

- Improper integrals.

- Change of variables.

1.4 Grade Calculation

- Weekly Quiz (every Friday): 30%

- Lecture & Discussion Attendance: 30%

- Final Exam: 40%

1.5 Grade Distribution

- F 0-40

- D 41-50

- C 51-65

- B 66-85

- A 86-100