Course Information for Math 350

- **Pre-requisites:** C or better in math 150B
- **Course Description:** Topics covered. The topics in brackets represent topics that are either not covered by all faculty or those that are covered only if time allows.

  Topology of the real numbers. Open, closed, and bounded sets. Infimum and supremum of sets. Completeness of $\mathbf{R}$. The rational numbers. (Compactness, Connectedness).

  Sequences and series. Convergence. Cauchy sequences and monotone sequences. Absolute vs. conditional convergence.

  Continuous functions. Definition of the limit of a function and a continuous function. The intermediate value theorem. The extreme value theorem. Uniform continuity. (Monotone functions and continuity of inverse functions).

  Differentiation. Definition of derivative. The chain rule and product/quotient rule. The mean value theorem.

  Riemann Integration. Definition of the Riemann integral. Integrability of monotone and continuous functions. The mean value theorem for integrals. The first and second fundamental theorems of calculus. (Improper Riemann integrals).

  Goals:

  1. To obtain a rigorous introduction of analysis in one variable.
  2. To understand the basic aspects of point-set topology (on the real line).
  3. To obtain a deeper knowledge of the theoretical and historical aspects of calculus
  4. To become proficient in reading and writing advanced mathematical proofs.

- **Books used:**

  Wade, An introduction to analysis, Sections 1.1-4.3.

  Browder, Introduction to Analysis, Chapters 1-5.

  Kirkwood, An Introduction to Analysis, Chapters 1-7.

  Spivak, Calculus.