

Suggested Background for Math 501

The background necessary for success in Math 501, Real Analysis, is very similar to that necessary for Math 503, Complex Analysis. Students should have the equivalent of a solid undergraduate course in Mathematical Analysis. This will include:

- Elementary Real Analysis. The student should understand the rigorous development of the basic concepts of single and multivariable calculus: completeness axiom for the real line; Heine-Borel theorem; definition of limits (convergence) and continuity; uniform convergence of functions and its difference from pointwise convergence; definition and basic properties (plus proofs) of derivatives and of the Riemann integral; sequences and series, sequences of functions.
- Point Set Topology in Metric Spaces: idea of a topological space, definition of metric space and important examples, continuity of metric space functions, compactness, connectedness, and completeness.

Chapters 1-7 of W. Rudin's *Introduction to Mathematical Analysis* will give the student a perfect idea of the type of material and the level of sophistication assumed in 501.

It is not that all the topics listed above are directly used. However, students entering 501 need the prior experience of thinking about analysis at the level of abstraction and rigor implied by these topics.