

## Real Analysis Qualifying Examination - Topics

### Advanced Calculus

Elementary set theory, and the topology of Euclidean space. Limits of functions and sequences, continuity. Pointwise and uniform convergence, and uniform continuity. Differentiation, the mean value theorem, Riemann integration of functions of several variables, and the inverse and implicit function theorems. (Recommended texts: W. Rudin's *Principles of Mathematical Analysis*, or Buck's *Advanced Calculus*. For supplementary reading, P. Halmos, *Naive Set Theory*.)

### Real Analysis

Lebesgue measure and integration on Euclidean space. Abstract metric and topological spaces. Integration theory on general measure spaces: Fubini's theorem, the Radon-Nikodym theorem, and the various convergence theorems.  $L^p$  spaces and other Banach spaces; rudimentary functional analysis. (Recommended texts: H. L. Royden's *Real Analysis* and W. Rudin's *Real and Complex Analysis*. M. E. Munroe's *Measure and Integration* may be useful. For supplementary reading, J. L. Kelley, *General Topology* and M. Reed and B. Simon, *Functional Analysis*.)