Syllabus for the Ph.D. Preliminary
Examination in Analysis

Topics

Metric Spaces: open and closed sets, convergence, compactness, connectedness, completeness, continuity, uniform continuity, uniform convergence, equicontinuity and the Ascoli-Arzela Theorem, contraction mapping theorem.

Single Variable Analysis: numerical sequences and series, differentiation, Mean Value Theorem, Taylor's Theorem, function series and power series, uniform convergence and differentiability, Weierstrass Approximation Theorem, Riemann integral, sets of measure zero.

Several Variables Analysis: differentiability, partial derivatives, Inverse and Implicit Function Theorems, iterated integrals, Jacobians, change of variable in multiple integrals.

Vector Analysis: Stokes Theorem, Green's Theorem, Divergence Theorem.

REFERENCES

1. Jerrold E. Marsden and Michael J. Hoffman, Elementary Classical Analysis, Freeman 1993.

2. W. Rudin, Principles of Mathematical Analysis, 3rd edition, McGraw-Hill, 1976.

3. Michael Spivak, Calculus on Manifolds, Addison-Wesley 1965.

4. T. Apostol, Mathematical Analysis, Addison-Wesley 1974.