

MATH 5070: APPLIED ANALYSIS
(3 credit hrs)

Course Description:

Fall. Metric spaces, uniform convergence, elements of Banach spaces, elements of functions of complex variable. Problem solving and independent proof writing. Review of selected advanced topics in analysis for the PhD preliminary examination.

Course pre-requisite: MATH 4320

Topical Syllabus:

- Entry-level graduate topics in analysis: \liminf , \limsup , Taylor's theorem in multiple variables, implicit function theorem – 10 hours
- Systematic development of metric spaces: continuous functions, completeness, compactness, uniform convergence, contraction principle, space of continuous functions, Arzela-Ascoli theorem – 20 hours
- Elements of Banach spaces: norm of linear operator, spaces of functions - 9 hours
- Elements of functions of complex variable: Cauchy formula, holomorphic functions, power series in complex variable – 6 hours
- Problem solving and independent proof writing – throughout, not scheduled separately

Example texts:

W. Rudin. Principles of mathematical analysis, 3rd edition. McGraw Hill, 1976

R. A. Silverman. Introductory Complex Analysis. Dover, 1984

J. T. Oden and L. F. Demkowicz, Applied Functional analysis, CRC Press, 1996

G.E. Shilov. Elementary Real and Complex Analysis. Dover Publications Revised edition, 1996

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