

Reference: <https://iitk.ac.in/math/index.php/2014-05-21-10-30-47/courses> (MTH 301)

Syllabus: Pre-requisite: MTH 101, None for M.Sc. 2 yr
Real Number system: Completeness property. Countable and Uncountable. Metric Spaces: Metric spaces, Limit, Open sets, Convergence of a sequence, Closed sets, Continuity. Completeness: Complete metric space, Nested set theorem, Baire category theorem, Applications. Compactness: Totally bounded, Characterizations of compactness, Finite intersection property, Continuous functions on compact sets, Uniform continuity. Connectedness: Characterizations of connectedness, Continuous functions on connected sets, Path connected. Riemann integration: Definition and existence of integral, Fundamental theorem of calculus, Set of measure zero, Cantor set, Characterization of integrable functions. Convergence of sequence and series of functions: Pointwise and uniform convergence of functions, Series of functions, Power series, Dini's theorem, Ascoli's theorem, Continuous function which is nowhere differentiable, Weierstrass approximation theorem.

Reference materials:

1. N. L. Carothers, Real Analysis.
2. R. R. Goldberg, Methods of Real Analysis.
3. W. Rudin, Principles of Mathematical Analysis.

Credits: 11