

MTH301 Analysis-I

Course contents:

Real Number system: Completeness property.

Countable and Uncountable.

Metric Spaces: Metric spaces, Examples: ℓ_p , $C[a, b]$; Limit, Open sets, Convergence of a sequence, Closed sets, Continuity.

Completeness: Complete metric space, Nested set theorem, Baire category theorem, An application.

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: Denition 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 no where differentiable, Weierstrass approximation theorem.

Instructor : Akash Anand

Course material and webpage :

All notices and course material for the course will be made available at the following URL
<http://home.iitk.ac.in/~akasha/mth301/index.php>

Homework :

Practice problem sets will be make available periodically and students are strongly advised to master the material of the home assignment. However, these homework are not going to be evaluated and counted toward the final grade.

Classroom : L2

Time :

Lecture – Monday, Wednesday, and Friday from 12:00 noon to 12:50 pm

Tutorial – Thursday from 12:00 noon to 12:50 pm

Exams and quizzes :

There will be *one mid-semester examination of two hours* and, *an end-semester examination of three hours*. These will be held during the prescribed examination period.

There may be one-or-two quizzes of ten minutes each. These quizzes may be held outside the regular class hour.

Academic honesty :

Students are free to collaborate on home assignments, but no collaborations are permitted during the examinations and quizzes.

Grading policy :

The mid-semester and end-semester examinations will contribute 30% and 50% respectively toward the final grade while the remaining 20% will come from quizzes.

References :

- (1) N. L. Carothers, Real Analysis.
- (2) W. Rudin, Principles of Mathematical Analysis.