

# CSIR UGC NET Mathematical Sciences

## Real Analysis and Linear Algebra

- Set Theory, Countable and Uncountable Sets
- Real Number System, Supremum and Infimum
- Sequences, Series and Convergence
- Continuity and Differentiability
- Mean Value Theorem
- Riemann and Lebesgue Integration
- Metric Spaces and Compactness
- Vector Spaces and Linear Transformations
- Matrices, Rank and Determinants
- Eigenvalues, Eigenvectors and Jordan Forms
- Inner Product Spaces and Quadratic Forms

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## Complex Analysis, Algebra and Topology

- Complex Numbers and Analytic Functions
- Cauchy-Riemann Equations
- Contour Integration and Residue Theory
- Taylor and Laurent Series
- Conformal Mapping and Mobius Transformations
- Permutations and Combinations
- Chinese Remainder Theorem
- Groups, Rings and Fields
- Polynomial Rings and Galois Theory
- Topology, Compactness and Connectedness

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## Differential Equations and Applied Mathematics

- First Order Ordinary Differential Equations
- Linear Differential Equations
- Boundary Value Problems
- Partial Differential Equations
- Laplace, Heat and Wave Equations
- Newton-Raphson Method
- Interpolation Techniques
- Numerical Integration
- Calculus of Variations
- Linear Integral Equations
- Classical Mechanics and Oscillations

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# CSIR UGC NET Mathematical Sciences

## Statistics, Probability and Operations Research

- Probability and Bayes Theorem
- Random Variables and Distributions
- Central Limit Theorem
- Markov Chains and Poisson Processes
- Estimation and Hypothesis Testing
- Regression Analysis
- Analysis of Variance
- Sampling Techniques
- Experimental Designs
- Linear Programming and Simplex Method
- Queueing and Inventory Models

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