

Fergusson College, Pune-4
Department of Mathematics
M.Sc.(Industrial Mathematics with Computer Applications)
Syllabus for the Entrance test

The Entrance test will consist of **50 Questions (Mathematics + General Quantitative Aptitude)**. The Syllabus for the Entrance test will be based on Mathematics specifically focussing on problems with the following topics

- **Calculus:** Limits, Continuity, Differentiation, Applications to maxima and minima, Integration, Applications to area under the curve, L'Hospital's Rule, Mean Value Theorems, Properties of Logarithmic and Exponential Functions .
- **Algebra:** Set Theory, Mathematical Induction, Arithmetic, Geometric and Harmonic Progressions, Complex Numbers, De-Moivre's Theorem, Polynomial Equations, Method of solving polynomials of degree two. Descartes Theorem to calculate number of roots, Relation between roots and coefficients.
- **Conic Sections:** Two dimensional Conics which include Lines, Circles, Parabola, Ellipse and Hyperbolas.
- **Probability Theory:** Permutations, Combinations, Binomial Theorem, Classical Definition of Probability, Inclusion-Exclusion Principle, Independence of Events, Conditional Probability.
- **Ordinary Differential Equations** Concepts of Order and degree of a Differential Equations, Various methods for solving First Order linear equations which include Variable Separable form, Homogeneous forms, Non-Homogeneous forms, Exact Differential Equations and Linear Differential Equation.
- **Linear Algebra:** Concepts of Vector Spaces, Subspaces, Linear Transforms, Matrix Representations, Rank-Nullity Theorem, Trace, Determinants, Computations of Eigenvalues, its related properties, Inner product spaces with some examples.
