

Question Bank 2022-2026 Batch
Applied Mathematics-I
Calculus and Linear Algebra
APPLIED MATHEMATICS – I
(CALCULUS AND LINEAR ALGEBRA)

Course Code: MAT101

Credit Units: 04

Total Hours: 40

Course Objective:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Contents:

Module I: Differential Calculus: (08 Hours)

Successive differentiation, Leibnitz Theorem, Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorems with remainders, Partial Differentiation, Total derivative; Maxima and minima for two variables.

Module II: Integral Calculus: (08 Hours)

Evaluation of definite and improper integrals: Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface, areas and volumes of revolutions, Multiple Integration: Double integrals (Cartesian and polar), Triple integrals (Cartesian).

Module III: Vector Calculus: (07 Hours)

Scalar and vector field, Gradient, Divergence and Curl, Directional Derivative, Evaluation of a Line Integral, Green's theorem in plane (without proof), Stoke's theorem (without proof) and Gauss Divergence theorem (without proof).

Module IV: Matrices: (07 Hours)

Inverse and Rank of a matrix, Linear systems of equations, Consistency of Linear Simultaneous Equations, linear Independence, Gauss elimination and Gauss-Jordan elimination, Eigen values, eigenvectors, Caley-Hamilton theorem, Diagonalization.

Module V: Linear algebra & Vector spaces: (10 Hours)

Linear algebra: Group, ring, field (Definition), Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, Inverse of a linear transformation, rank- nullity theorem (without proof), composition of linear maps, Matrix associated with a linear map.