MT-315 Mathematical Methods

Linear Algebra & Matrices:

Linearity, dependent & independedt vectors, bases & dimension, vector space, fields, linear transformation, matrix of linear transformation. Basic definition & matrix operations, adjoint & inverse of a matrix, Rank of a matrix. Cayley-Hamilton Theorem, Eigen values. Applications In solving linear homogeneous & non homogeneous equations in three unknowns. Case of existence of solution, no solution, infinite & unique solutions.

Advanced Calculus:

Taylor's Theorem for functions of two variables without proof. Maxima and minima of functions of two variables. Largrange's Method of multipliers.

Double Integrations, Change of order, Conversion to polar form. Applications in finding areas, Volumes, Centroids, Centre of pressure. Moment of, inertia and principal axes. Theorems of Pappus and Guldnus. Surface areas and volumes of revolution.

Vector Calculus:

Differentiation of vectors, Gradient, Divergence and curl. Laplacian and spherical harmonics. Vector integration. Theorems of Gauss' Green and Stokes. Simple applications.

Solid Geometry:

Rectangular Coordinate System In three dimensions, direction cosines, plane(straight line) and sphere.

Element of Tensors

Cartesian Tensors, Understanding of stress tensor and deformation.