MT-251 Multivariate Calculus

Vectors and analytic geometry in space: coordinate system, rectangular, cylindrical and spherical coordinates, the dot product, the cross product, equations of lines and planes, quadric surfaces. Vector-valued functions: vector-valued functions and space curves, derivatives and integrals of vector valued functions, arc length, curvature, normal and binormal vectors, multivariable functions and partial derivatives: functions of several variables, limits and continuity, partial derivatives, composition and chain rule, directional derivatives and the gradient vector, implicit function theorem for several variables, maximum and minimum values, optimization problems, Lagrange multipliers. Multiple integrals: double integrals over rectangular domains and iterated integrals on-rectangular domains, double integrals in polar coordinates, triple integrals in rectangular, cylindrical and spherical coordinates, applications of double and triple integrals, change of variables in multiple integrals, vector calculus: vector fields, line integrals, green's theorem, curl and divergence, surface integrals over scalar and vector fields, divergence theorem, stokes' theorem.

Recommended Books:

1. "Calculus", Thomas, Addison Wesley Publishing Company, 11th Edition, 2005.

2. "Calculus", H. Anton, I. Bevens, S. Davis, John Wiley & Sons, Inc., 8th Edition, 2005.

3. "Calculus, Schaum's outlines series", Frank A. Jr, Elliott Mendelson, 4th Edition, 1999.