

# **MT-226 Multivariable Calculus**

## **Advanced Calculus:**

Define a stationary point of a function of several variables, define local maximum and saddle point for a function of two variables the stationary points of a several variables, obtain higher partial derivatives of simple functions of two or more variables, iterated integrals, double and triple integrations with applications (area, centroid, moment of inertia, surface area, and volume, use multiple integrals in solutions of engineering problems.

## **Vector Calculus:**

Dot and cross product, Vector differential operator, directional derivative, gradient, divergence, curl of a vector field, and Laplacian operators with applications. (Solenoid, conservative, etc).

## **Vector Integrations:**

Evaluate line integrals along simple paths, apply line integrals to calculate work done, apply Green's theorem in the plane to simple examples, evaluate surface integrals over simple surface, use the Jacobean to transform a problem a new coordinate system, apply Gauss' divergence theorem to simple problems, apply Stokes theorem to simple examples.

## **Curvilinear Coordinates:**

Unit vectors in curvilinear system; Transformation of coordinates; Orthogonal coordinate system; Cylindrical coordinate system; Spherical coordinate system; Parabolic cylindrical coordinates; Elliptical cylindrical coordinate system.

## **Recommended Books**

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| 1. Advance Engineering Mathematics | Erwin Kreyszig  | Seven Edition |
| 2. Calculus & Analytical Geometry  | Howard Anton    | Fifth         |
| 3. Calculus                        | Thomas & Finney | 1994          |