

**Annexure-II(B)**  
**Draft of (20%) Reduced Syllabus due to Covid-19**  
**B.Sc. (Regular) Mathematics**  
**BODOLAND UNIVERSITY**

**1<sup>st</sup> Semester**

**DSC-1(A): Differential Calculus**

Limit and Continuity ( $\epsilon$  and  $\delta$  definition), Types of discontinuities, Differentiability of functions, Successive differentiation, Leibnitz's theorem, Partial differentiation, Euler's theorem on homogeneous functions.

Tangents and normals, Curvature, Asymptotes, Singular points, Tracing of curves. Parametric representation of curves and tracing of parametric curves.

Rolle's theorem, Mean Value Theorems, Taylor's Theorem with Lagrange's & Cauchy's forms of remainder. Taylor's series, Maclaurin's series of  $\sin x$ ,  $\cos x$ ,  $e^x$ ,  $\log(l+x)$ ,  $(l+x)^m$ .

**Books Recommended**

1. H. Anton, I. Birens and S. Davis, *Calculus*, John Wiley and Sons, Inc., 2002.
2. G.B. Thomas and R.L. Finney, *Calculus*, Pearson Education, 2007.

**3<sup>rd</sup> Semester**

**DSC-1(C): Real Analysis**

Finite and infinite sets, examples of countable and uncountable sets. Real line, bounded sets, suprema and infima, completeness property of  $\mathbb{R}$ , Archimedean property of  $\mathbb{R}$ , intervals. Concept of cluster points and statement of Bolzano-Weierstrass theorem.

Real Sequence, Bounded sequence, Cauchy convergence criterion for sequences. Cauchy's theorem on limits, order preservation and squeeze theorem, monotone sequences and their convergence (monotone convergence theorem without proof).

Infinite series. Cauchy convergence criterion for series, positive term series, geometric series, comparison test, convergence of p-series, Root test, Ratio test, alternating series, Leibnitz's test (Tests of Convergence without proof). Definition and examples of absolute and conditional convergence.

**Books Recommended**

1. T. M. Apostol, *Calculus* (Vol. I), John Wiley and Sons (Asia) P. Ltd., 2002.
2. R.G. Bartle and D. R Sherbert, *Introduction to Real Analysis*, John Wiley and Sons (Asia) P. Ltd., 2000.
3. E. Fischer, *Intermediate Real Analysis*, Springer Verlag, 1983.

4. K.A. Ross, *Elementary Analysis- The Theory of Calculus Series-* Undergraduate Texts in Mathematics, Springer Verlag, 2003.

### **SEC-1: Analytical Geometry**

Techniques for sketching parabola, ellipse and hyperbola. Reflection properties of parabola, ellipse and hyperbola. Classification of quadratic equations representing lines, parabola, ellipse and hyperbola. Spheres.

#### **Books Recommended**

1. G.B. Thomas and R.L. Finney, *Calculus*, 9th Ed., Pearson Education, Delhi, 2005.
2. H. Anton, I. Bivens and S. Davis, *Calculus*, John Wiley and Sons (Asia) Pvt. Ltd., 2002.
3. S.L. Loney, *The Elements of Coordinate Geometry*, McMillan and Company, London.
4. R.J.T. Bill, *Elementary Treatise on Coordinate Geometry of Three Dimensions*, McMillan India Ltd., 1994.

## **5<sup>th</sup> Semester**

### **SEC -3: Probability and Statistics**

Sample space, probability axioms, real random variables (discrete and continuous), cumulative distribution function, probability mass/density functions, mathematical expectation, moments, moment generating function, discrete distributions: uniform, binomial, Poisson.

Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions, expectation of function of two random variables.

#### **Books Recommended:**

1. Robert V. Hogg, Joseph W. McKean and Allen T. Craig, *Introduction to Mathematical Statistics*, Pearson Education, Asia, 2007.
2. Irwin Miller and Marylees Miller, John E. Freund, *Mathematical Statistics with Application*, 7th Ed., Pearson Education, Asia, 2006.
3. Sheldon Ross, *Introduction to Probability Model*, 9th Ed., Academic Press, Indian Reprint, 2007.

### **DSE -1(A): Mechanics**

Conditions of equilibrium of a particle and of coplanar forces acting on a rigid Body, Laws of friction, Problems of equilibrium under forces including friction, Centre of gravity, Work and potential energy. Velocity and acceleration of a particle along a curve: radial and transverse components (plane curve), tangential and normal components (space curve), Newton's Laws of motion, Simple harmonic motion, Simple Pendulum, Projectile Motion.

### **Books Recommended**

1. A.S. Ramsay, *Statics*, CBS Publishers and Distributors (Indian Reprint), 1998.
2. A.P. Roberts, *Statics and Dynamics with Background in Mathematics*, Cambridge University Press, 2003.