

**REDUCED SYLLABUS  
FOR  
ODD SEMESTERS (1<sup>ST</sup>, 3<sup>RD</sup>, 5<sup>TH</sup> )**

**FOR 2020 – 2021 SESSION**

**B.SC. MATHEMATICS (PROGRAMME)  
ON CHOICE BASED CREDIT SYSTEM**

**COOCH BEHAR PANCHANAN BARMA UNIVERSITY**

**First, Second and Third Semesters papers to be taught in  
B.Sc. Mathematics (Programme) course**

Semester	Course Name	Course Detail
I	DSC – 1A	Differential Calculus
III	DSC – 1C	Real Analysis
	Skill Enhancement Course–1	Integral Calculus
V	Skill Enhancement Course–3	Probability and Statistics
	Discipline Specific Elective–1A	Linear Algebra

## Reduced syllabus for Semester-I

### Syllabus of core subjects:

#### DSC-1A: Differential Calculus

**Objectives:** This course will help students to understand limit, continuity, differentiability and partial differentiation. They will also learn Rolle's theorem, mean value theorems, maxima and minima, indeterminate forms and different applications of 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

Rolle's theorem, Mean Value theorems, Taylor's theorem with Lagrange's and Cauchy's forms of remainder, Maxima and Minima, Indeterminate forms.

#### 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.

## Reduced syllabus for Semester-III

### Syllabus of core subjects:

#### DSC – 1C: Real Analysis

**Objectives:** Students will be able to understand about sets in  $\mathbb{R}$ , sequences, series of functions and infinite series etc in this course.

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

Power series and radius of 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.

### Syllabus of Skill Enhancement Course (SEC):

#### SEC 1. (a) Integral Calculus

**Objectives:** The students will be able to learn the different integration techniques, reduction formulae and to calculate the surface area and volume of various solids of revolution.

Integration by Partial fractions, integration of rational and irrational functions. Properties of definite integrals. Reduction formulae for integrals of rational, trigonometric, exponential and logarithmic functions and of their combinations.

Areas and lengths of curves in the plane, Double integrals.

### **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) P. Ltd., 2002.

## **Reduced syllabus for Semester-V**

### **Syllabus of Skill Enhancement Course (SEC):**

#### **SEC 3. (a) Probability and Statistics**

**Objectives:** In this course students will know about basic concepts on probability and statistics. Various probability distributions and their applications, mathematical expectation, moments etc. have been discussed.

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

#### **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.

## Syllabus of Discipline Specific Elective (DSE) subjects:

### DSE 1A. (a) Linear Algebra

Objectives: Students shall learn basic concepts of vector spaces, basis, linear transformations, eigen values and eigen vectors etc in this course of study .

Vector spaces, subspaces, algebra of subspaces, quotient spaces, linear combination of vectors, linear span, linear independence, basis and dimension, dimension of subspaces.

Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations.

Eigen values and Eigen vectors, Characteristic Polynomial.

### Books Recommended

1. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, *Linear Algebra*, 4<sup>th</sup> Ed., Prentice-Hall of India Pvt. Ltd., New Delhi, 2004.
2. David C. Lay, *Linear Algebra and its Applications*, 3<sup>rd</sup> Ed., Pearson Education Asia, Indian