

ADD-ON COURSE: DEPARTMENT OF STATISTICS

Title of the course:

“Bridging Mathematics: Sets, Sequence and Calculus”

The Course:

Department of Statistics, Nalbari College has specially designed a certificate course in Bridging Mathematics: Sets, Sequence and Calculus for those students who are pursuing UG course. In this course the candidates shall learn the basics of Set Theory, algebra and Calculus.

Focus:

The main objective of this course is to provide fundamental knowledge in Mathematics which will help students in transition from HS Level to UG Level by bridging the gap in essential knowledge of Mathematics required for UG course of Statistics.

Syllabus:

Unit 1: (5 Hours)

Sets:

Sets and their representations, Empty Set, Finite and Infinite Sets, Equal Sets, Subsets, Subsets of the set of real numbers especially intervals (With Notations), Power Set, Universal Set, Venn Diagrams, Union and Intersection of Sets, Difference of Sets, Complement of a Set.

Unit 2: (5 Hours)

Sequence and Series:

Sequence and Series: Arithmetic Progression (A.P), Arithmetic Mean (A.M.), Geometric Progression (G.P.), General term of a G.P., Sum of n terms of a G.P., Geometric Mean (G.M.), Relation between A.M. and G.M., Sum to n Terms of the Special Series: $\Sigma n, \Sigma n^2$ and Σn^3 , Application of Euler Maclaurin's Theorem in Exponential, Logarithmic series

Unit3: (10 Hours)

Differential Calculus:

Limit, Continuity and Differentiation

Limit: Limit of a function, Left hand limit and Right hand Limit, Existence of Limit, Fundamental Theorems on Limit (Without Proof)

Continuity: Continuity at a point, Continuity in an interval, Properties of continuous function

Differentiation: Differentiable function, Left Hand Derivative and Right Hand Derivative, Some Fundamental Theorems on Derivatives (Without Proof), Some Important Formulae, Methods of

Differentiation: Chain Rule. Logarithmic Differentiation, Second Derivative, Monotonic Function, Maxima and Minima

Unit 4: (10 Hours)

Integral Calculus:

Integration: Introduction, Indefinite Integrals: Standard Integrals, Elementary Laws of Integration, Method of Substitution, Integration by Parts of Product, Integration by Partial Fractions, Integration of Special Trigonometric Functions.

Definite Integral: Definition, Fundamental Theorem (Without Proof), Properties, Geometrical Interpretation as area.

Criteria for Getting the Certificate

1. Students shall have at least 75% attendance to complete the course.
2. The course is framed to be of 30 hour duration.
3. The total score of the course will be 100 out of which 20 marks are assigned for internals, 80 marks for final theory exam.
4. The course coordinator will be in charge of the examinations.
5. The students shall attend and pass the exam, which will be completed at the end of the course, with at least 40% marks.

GRADING PATTERN (Marks in Percentage):

Marks	Grade	Interpretation
90 and Above	A+	Outstanding
80-89	A	Excellent
70-79	B	Very good
60-69	C	Good
50-59	D	Satisfactory
40-49	E	Pass/Adequate
Below 40	F	Failure
