

BRIDGE COURSE IN MATHEMATICS FOR B.SC. PHYSICS AND B.SC. PHYSICS AND COMPUTER APPLICATIONS.

A bridge course for newly admitted students of B.Sc. Physics and B.Sc. Physics and Computer Applications is conducted every year before the commencement of the first semester classes. The main objective of the course is to bridge the gap between subjects studied at school level and subjects they would be studying in Graduation. The syllabus for the course is framed in such a way that they get basic knowledge on the subjects which they would be learning through graduation. Accordingly, the Bridge Course has been prepared with the dual objective of reviewing the studies done by the students in the previous academic year and helping them to learn the curriculum of the present class in this academic year. During the first week after the commencement of the classes, the bridge course curriculum is delivered to the students in various disciplines. A post bridge course test is conducted after the completion of bridge course syllabus (at the end of II sem) to assess the ability of students.

Mathematics is mother of all sciences. It is one of the fundamental subjects in the BSc. Physics course. The extent of understanding core papers in Physics like Quantum Mechanics, Classical Mechanics, Nuclear Physics, Spectroscopy etc. then depends on the mathematical background. However, there is a gap in the mathematics learnt at the school level and the mathematics they are going to study in the BSc. Physics programme. To bridge this gap and to strengthen the fundamentals of the students, a module on mathematics is incorporated as bridge course. It would enable the students to grasp the concepts of mathematics quickly and efficiently.

SYLLABUS FOR BRIDGE COURSE IN MATHEMATICS (2019-20)

Aim of the Bridge course in Mathematics is

1. To make "learning of Mathematics as a pleasant experience".
2. To Bridge "the School education and graduate education".

Total number of hours to be handled : 25

I. Matrices, Vector Algebra and Partial Fractions

Basic needs of matrices - Physical interpretation of matrices - Types of matrices - Operations on matrices. (1 Hour)

Properties of matrices - Determinants - Relation between matrices and determinants - Properties of determinants. (1 Hour)

Representation of vectors - Physical interpretation of vectors - Types of vectors - Operation on vectors - Direction ratios and direction cosines. (2 Hours)

Applications of partial fractions - Importance of partial fractions - Types. (1 Hour)

II. Series & Sequences and Trigonometric Functions

Importance of series and sequences – Link between series and sequences - Validity of series - Conditions for convergence and divergence. (2 Hours)

Binomial series - Exponential series - Logarithmic series. (1 Hour)

Angles - Measurements - Degrees - Radians - Quadrants - Trigonometric ratios - Ratios of particular angles. (2 Hours)

III. Differential Calculus

Limits and continuity - Concepts of continuity - Derivatives of a function - Differentiation rules - Derivatives of trigonometric function. (2 Hours)

Chain rule - Techniques of differentiation - Total and partial derivatives. (2 Hours)

Theory of equations - Relation between roots and coefficients - Expressions - Equations and factors. (1 Hour)

IV. Integral Calculus

Applications of integration - Definite and indefinite integrals - Proper and improper integrals - Techniques of integration. (2 Hours)

Integration by substitution - Integration by parts - Bernaulli's formula (2 Hours)

Integration by using partial fractions. (1 Hour)

V. Differential Equations

ODE - PDE - Applications of ODE & PDE - Formation of ODE & PDE. (2 Hours)

Order - Degree - Need of differential equations & importance. (1 Hour)

Linear & non linear - Homogeneous & non homogeneous equations. (1 Hour)

Relation between constant coefficients & variable coefficients. (1 Hour)