

## **Mathematics-1 MATH-1111**

### **Course Introduction**

This course covers the basic as well as advanced concepts of algebra, including the solution of linear and nonlinear equations. Moreover, the concepts from trigonometry are discussed in detail including their applications in solving real-life problems. The successful completion should develop an understanding of the concepts, which strengthens the understanding of mathematical techniques. Further, it should equip the students with trigonometric identities, their conceptual background and the applications of these concepts in solving mathematical and engineering problems.

### **Course Contents**

Revision of basic concepts of Sets, operations on sets and properties of operations on sets, relations, functions. Inductive and deductive logic, implications, truth sets. Solving equations are reducible to quadratic equations. Cube roots and fourth roots of unity. Polynomial function, synthetic division. Solving systems of two equations involving two variables. Introduction to factorial of a number. Fundamental principle of counting, permutations, combinations. Basic concept and estimation of probability. Mathematical Induction and Binomial Theorem: Principle of mathematical induction. Binomial Theorem for positive and negative integral indices. Revision of concepts of trigonometry, including trigonometric functions at any angle, their signs, and basic trigonometric identities. Relationship between length of an arc of a circle and circular measures of its central angle. Identities and Graphs of Trigonometric Functions Double and half-angle identities. Sum, difference, and product of sines and cosines. Domain and range of trigonometric functions. Period of trigonometric functions. Graphs of six basic trigonometric functions. Domain and range of inverse trigonometric functions. Graphs of inverse trigonometric functions. Introduction and solution of general trigonometric equations.

**Book:**

Mathematics-I Algebra and Trigonometry, (1st Edition), Punjab Textbook Board,  
Lahore Reference Algebra and Trigonometry, (3rd Edition), Jacqueline M. Dewar and  
D. G. Zill

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