Syllabi of Mathematics IDC Courses

Semester*   : I
Course Type   : IDC
Course Code**   : MATIDC101
Name of the Course : Foundation Course in Mathematics
Learning level**   : 100
Credits   : 3
Contact Hours   : 50
Total Marks   : 100
End Semester Marks : 70
Internal Marks   : 30
Course Objective

The main objective of this course is to enable the learners review basic mathematical concepts that are helpful for various competitive examinations.

Unit – I
Place value, face value of digits in decimal number system. Natural numbers, integers, rational numbers. Divisibility of integers. Problems on LCM, GCD, fractions, ratio & proportion, percentage, profit and loss, simple and compound interest.

Unit – II
Unitary method, problems on time and work, speed and distance. Surds, Laws of exponents. Elementary set theory, union, intersection, difference, cartesian product of sets, subsets, number of elements of sets.

Unit – III
Simultaneous Linear equations in two variables and related problems. Quadratic equations and related problems. Arithmetic Progression, Geometric Progression.

Unit – IV
Permutation and Combination, Binomial Theorem for positive integer indices. Introduction to Probability, simple problems.

Unit – V
Matrices: order, transpose, sum, difference, scalar multiple, product, inverse. Symmetric and skew-symmetric matrices. Determinant of a square matrix, problems on evaluating determinants. Elementary row and column operations on matrices. Use of matrices and determinants to solve system of linear equations.

Textbooks:

1. J.C. Chakravarti, Arithmetic for the use of schools and colleges, 16th ed., Sanyal and Co., 1920.
2. J.G. Chakraborty and P.R. Ghosh, Higher Algebra: Classical and Modern, 23rd ed., U.N. Dhur and Sons, 1972.

Reference books:

1. V. Krishnamurthy, C.R. Pranesachar, K.N. Ranganathan, and B.J. Venkatachala, Challenge and thrill of Pre-College mathematics, 4th ed., New Age International, 2022.
2. V.K. Sinha, Introduction to Matrix Theory, 1st ed., Narosa Publishing House, 2014.

Course Learning Outcome

After completion of the course, learners will be able to
1. Understand and apply concepts of numbers, fractions, ratios, percentages, and basic financial calculations.
2. Solve problems related to time, work, speed, distance, exponents, surds, sets, and equations.
3. Apply principles of permutation, combination, binomial theorem, and introductory probability.
4. Demonstrate proficiency in working with matrices, including operations, determinants, and solving linear equations.
5. Apply mathematical concepts to real-life scenarios, develop critical thinking and problem-solving skills, and communicate mathematical ideas effectively.