

# 0944 -DIPLOMA IN INFORMATION TECHNOLOGY & ENGINEERING

## SEMESTER -I

### 094412 - APPLIED MATHEMATICS – I

#### RATIONALE

Applied Mathematics forms the backbone of engineering discipline. Basic elements of permutations and combinations, trigonometry, vector, complex number and statistics have been included in the curriculum as foundation course and to provide base for continuing education to the students.

#### DETAILED CONTENTS

#### 1. Algebra

- 1.1 Permutations and Combinations, Value of  $nPr$  and  $nCr$ , its properties and simple problems
- 1.2 Binomial theorem (without proof) for positive integral index (expansion and general term); Binomial theorem for any index (expansion only) first and second binomial approximation with application to engineering problems
- 1.3 Partial fractions (linear factors, repeated linear factors, non reducible quadratic factors)
- 1.4 Determinants and Matrices – expansion of determinants (upto third order) using sarrus rule, expansion method and pivotal's condensation method. Properties of determinants, solution of equations (upto 3 unknowns) by Cramer's rule. Definition of matrix, addition, subtraction and multiplication of matrices (upto third order). Inverse of a matrix by adjoint method and elementary row transformations. Solution of equations (up to 3 unknowns) by Matrix method
- 1.5 Logarithm: general properties of logarithms, calculations of engineering problems using log tables

#### 2. Trigonometry

- 2.1 Addition and subtraction formulae, product formulae and their application in engineering problems. Transformation from product to sum or difference of two angles or vice versa, multiple and sub-multiple angles
- 2.2 Conditional identities, solution of triangles (excluding ambiguous cases).
- 2.3 Graphs of  $\sin x$ ,  $\cos x$ , and  $\tan x$ ,  $e^x$

#### 3. Vectors

Definition of vector and scalar quantities. Addition and subtraction of vectors. Dot product and cross product of two vectors. Thumb rule. Angle between two vectors, application of dot and cross product in engineering problems, scalar triple product and vector triple product

#### 4. Complex Numbers

Definition, Real and Imaginary parts of a complex number, Polar and Cartesian representation of a complex number and conversion from one form to the other, conjugate of a complex number, modulus and argument of a complex number, addition, subtraction, multiplication and division of a complex number.

## 5. Statistics and Probability

Evaluation of standard deviation and process capabilities. Rank, Rank correlation, probability: definition and laws on probability, concept of random variable, probability distribution (Binomial, Poisson and Normal) and their applications. Drawing control charts for average ( $\bar{x}$ ) and range (R)

### RECOMMENDED BOOKS

1. Applied Mathematics Vol. I by SS Sabharwal and Others by Eagle Prakashan, Jalandhar
2. Applied Mathematics Vol. II by SS Sabharwal and Others by Eagle Prakashan, Jalandhar
3. Engineering Mathematics Vol. I by Ishan Publishing House
4. Engineering Mathematics Vol. I by S Kohli and Others; IPH, Jalandhar
5. Applied Mathematics Vol. I by RD Sharma
6. Engineering Mathematics by Dass Gupta
7. Advanced Engineering Mathematics by AB Mathur and VP Jagi; Khanna Publishers, Delhi
8. Higher Engineering Mathematics by BS Grewal; Khanna Publishers, Delhi
9. Engineering Mathematics by C Dass Chawla; Asian Publishers, New Delhi