

1.2 APPLIED MATHEMATICS - I

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RATIONALE

Applied Mathematics forms the backbone of engineering students. The curriculum of mathematics has undergone changes from time to time in accordance with growth of subject. Diploma in Engineering is a launching stage where the students learn the basics of engineering. The revised syllabus has been designed keeping in view the emerging needs of all categories of students. Great emphasis has been laid on application of various contents like algebra, complex numbers, trigonometry and coordinate geometry. This course will develop analytical abilities to make exact calculations and provide continuing educational base to the students.

Note:- Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

DETAILED CONTENTS

1. Algebra (30 hrs)
 - 1.1 Concept of permutations and Combinations: Value of ${}^n P_r$, ${}^n C_r$.
 - 1.2 Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof)
 - 1.3 Partial fractions (linear factors, repeated linear factors, non-reducible quadratic factors excluding repeated factors)
 - 1.4 Determinants and Matrices – expansion of determinants (upto third order) by laplace expansion method, solution of equations (upto 3 unknowns) by Cramer’s rule. Definition of matrix, addition, subtraction, multiplication of matrices (upto third order), minors and co-factors, inverse of a matrix by adjoint method (upto second order)

2. Trigonometry (20 hrs)

Review of ratios of some standard angles (0,30,45,60,90 degrees), T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T-Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2).

3. Complex numbers (10 hrs)

Definition of complex numbers, real and imaginary parts of a complex number, polar and cartesian form and their inter-conversion, conjugate of a complex number, modulus and argument of a complex number, addition, subtraction, multiplication and division of a complex number.

4. Co-ordinate Geometry (20 hrs)
- 4.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines, perpendicular distance formula (without proof)
- 4.2 General equation of a circle and its characteristics. To find the equation of a circle, given:
- * Centre and radius
 - * Three points lying on it
 - * Coordinates of end points of a diameter
- 4.3 Equations of conics (ellipse, parabola and hyperbola), simple problems related to engineering (standards forms only)

INSTRUCTIONAL STRATEGY

Basic elements of algebra, trigonometry, complex numbers and coordinate geometry should be taught in the light of their applications in the field of engineering and technology. By laying more emphasis on applied part, teacher can also help in providing a good continuing education base to the students.

RECOMMENDED BOOKS

1. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar
3. Applied Mathematics by Dr. RD Sharma, Dhanpat Rai Publications, Delhi
4. Applied Mathematics, Vol. I & II by SS Sabharwal & Sunita Jain, Eagle Parkashan, Jalandhar
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	30	40
2	20	25
3	10	10
4	20	25
Total	80	100