

COURSE NAME : DIPLOMA IN TEXTILE MANUFACTURES

COURSE CODE : TM

SEMESTER : FIRST

SUBJECT TITLE : BASIC MATHEMATICS

SUBJECT CODE : 9003

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
04	01	--	03	80	20	--	--	--	100

Notes: 1. This subject is common for all courses.

2. For smooth implementation and uniformity, the schedule for tutorial is given separately.

RATIONALE:

The subject is classified under basic sciences and intends to teach students

Basic facts, concepts and principles of mathematics as a tool to analyze

Engineering problems. Mathematics lay down the foundation for understanding core technology subjects.

OBJECTIVE:

This subject helps the students to develop logical thinking, which is useful in

comprehending the principles of all other subjects. Analytical and systematic approach towards any problem is developed through learning of this subject.

Mathematics being a versatile subject can be used at every stage of human life.

Learning Structure:

Application

To understand the techniques and methods for solving Engg. Problems such as simultaneous equations involved in vibrations, ckts. Laws of friction, projections, Lami's theorem, Stress-strain curves etc. Work done moment of force about a point and line

Procedure

To explain use of Cramer's rule, matrix inversion, partial fraction of proper and improper fractions, Binomial theorem for positive and negative index.	To explain use of formulae from trigonometry for solving engineering problem.	To explain formulae from co-ordinate geometry for finding distance between two points, Equation of straight line, condition of parallel and perpendicular lines. Equation of circle.	To explain algebra of vectors, dot & cross products, finding workdone, moment of force
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Concept

Cramer's Rule, Algebra of matrices, Inverse of a matrix, cases of finding partial fractions, permutation-combination, Binomial expansion for positive and negative index.	Trigonometric ratios of any angle, their relations, trig. Ratios of allied, compound and multiple angles, inverse trig. Ratios. Sine, cosine rules.	Distance formula, section formula, centroid, area of triangle, different forms of equation of straight line and circle.	Laws of parallelogram, triangle. Scalar and vector product
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Facts

Definitions of determinant, matrix, polynomial, polynomial fractions, definition of permutation and combination.	Angle, positive and negative angle, measurement of an angle, definition of trig. Ratios, fundamental identities.	Co-ordinate of a point, slope and intercept of a line. Centre and radius of a circle.	Definition of vector, magnitude of a vector
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CONTENTS:Theory

Chapter	Name Of Topics	Hours	Marks
1.	ALGEBRA	02	
	1.1 REVISION 1.1.1 Laws of Indices 1.1.2 Formula of factorization and expansion (a^2-b^2), $(a+b)^2$ etc.) 1.1.3 Laws of logarithm with definition of Natural and Common logarithm.		
	1.2 PARTIAL FRACTION 1.2.1 Definition of polynomial fraction proper & improper fractions and definition of partial fractions. 1.2.2 To Resolve proper fraction into partial fraction with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors. 1.2.3 To resolve improper fraction into partial fraction.	04	08
	1.3 DETERMINANT AND MATRICES. Determinant ----- 4 Marks 1.3.1 Definition and expansion of determinants of order 2 and 3. 1.3.2 Cramer's rule to solve simultaneous equations in 2 and 3 unknowns. Matrices----- 12Marks 1.3.3 Definition of a matrix of order m X n and types of matrices. 1.3.4 Algebra of matrices such as equality, addition, Subtraction, scalar multiplication and multiplication. 1.3.5 Transpose of a matrix. 1.3.6 Minor, cofactor of an element of a matrix, adjoint of matrix and inverse of matrix by adjoint method. 1.3.7 Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method.	12	16
1.4 BINOMIAL THEOREM 1.4.1 Definition of factorial notation, definition of permutation and combinations with formula. 1.4.2 Binomial theorem for positive index. 1.4.3 General term. 1.4.4 Binomial theorem for negative index. 1.4.5 Approximate value (only formula)	04	04	

02	TRIGONOMETRY.		
	2.1 REVISION 2.1.1 Measurement of an angle (degree and radian). Relation between degree and radian. 2.1.2 Trig ratios of 0^0 , 30^0 , 45^0 etc. 2.1.3 Fundamental identities.	02	04
	2.2 TRIGONOMETRIC RATIOS OF ALLIED, COMPOUND, MULTIPLE & SUBMULTIPLE ANGLES (Questions based on numerical computations, which can also be done by calculators, need not be asked particularly for allied angles).	08	08
	2.3 FACTORIZATION AND DEFACTORIZATION FORMULAE	04	04
	2.4 INVERSE TRIGONOMETRIC RATIOS 2.4.1 Definition of inverse trigonometric, ratios, Principal values of inverse trigonometric ratios. 2.4.2 Relation between inverse trigonometric ratios.	02	04
	2.5 PROPERTIES OF TRIANGLE 2.5.1 Sine, Cosine, Projection and tangent rules (without proof) 2.5.2 Simple problems.	02	04
03	COORDINATE GEOMETRY		
	3.1 POINT AND DISTANCES 3.1.1 Distance formula, Section formula, midpoint, centroid of triangle. 3.1.2 Area of triangle and condition of collinearity.	04	04
	3.2 STRAIGHT LINE 3.2.1 Slope and intercept of straight line. 3.2.2 Equation of straight line in slope point form, slope-intercept form, two-point form, two-intercept form, normal form. General equation of line. 3.2.3 Angle between two straight lines condition of parallel and perpendicular lines. 3.2.4 Intersection of two lines. 3.2.5 Length of perpendicular from a point on the line and perpendicular distance between parallel lines.	06	10
	3.3 CIRCLE 3.3.1 Equation of circle in standard form, centre – radius form, diameter form, two – intercept form. 3.3.2 General equation of circle, its centre and radius.	06	06

04	VECTORS	04	04
	4.1 Definition of vector, position vector, Algebra of vectors (Equality, addition, subtraction and scalar multiplication) 4.2 Dot (Scalar) product with properties. 4.3 Vector (Cross) product with properties.		
	4.4 Applications	04	04
	4.4.1 Workdone and moment of force about a point & line		
TOTAL		64	80

Tutorial:

Tutorial No.	Topic on which tutorial is to be conducted
1	Partial fractions
2	Determinants
3	Matrices
4	Solution of simultaneous equation by Matrix inversion method.
5	Binomial theorem
6	Trigonometry- fundamental identities-revision only
7	Trigonometry-allied, compound and multiple angles
8	Trigonometry-factorization and defactorization formulae.
9	Trigonometry-inverse trigonometric ratios.
10	Point and distances
11	Straight line
12	Circle.
13.	Vectors
14.	Vectors' applications

Note:

Maximum 5 questions are to be given in each tutorial, in which two 2 marks questions (based on basic concept and formulae with one/two step calculations) and three 4 marks questions are expected.

LEARNING RESOURCES:**BOOKS:**

Sr. No.	Title	Authors	Publications
1	Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha
2	Trigonometry	S. L. Loney	S. Chand Publication
3	Higher Algebra	H. S. Hall & S. R. Knight	Metric edition, Book Palace, New Delhi
4	College Algebra	Frc.G. Valles	Charotar Publication
5	Matrices	Ayres	Schuam series, McGraw hill
6	Higher Engineering Mathematics	B. S. Grewal	Khanna publications New Dehli
7	Engineering Mathematics	S. S. Sastry	Prentice Hall of India

