GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA   ENGINEERING (INTERDISCIPLINARY)
SEMESTER- I

Subject Code : **310034**   (w.e.f 4th August,2011)

 Subject Name: **Mathematics-I**

RATIONALE :

    The entrance qualifications for a Diploma technician is 10th pass. They have gained sufficient knowledge of the course Mathematics in the standard 10th to qualify for further studies in diploma programmes. A technician engineer needs to study relevant theories and principles of Mathematics to enable them to understand & grasp the concepts of the advance courses of diploma programme and their various Engineering applications.

    With this view, the necessary content for the course Mathematics is designed and developed in consultations with the senior technical teachers to make students capable to understand the technology related courses at higher levels. It is presumed that this course-content will provide a suitable foundation for all the engineering applications which technician is supposed to come across in his field and will be able to use it in understanding them during his diploma study.

Sr. No.	Subject Content	Hrs.
	PART – I (ALGEBRA)	
1	**LOGARITHAM** 1.1 Definition and concept 1.2 Logaritham ruls 1.3 Examples based on ruls.(Without using Logarithmic Tables)	5
2	**GEOMETRICAL PROGRESSION** 2.1 Definition 2.2 n^{th} term and sum of n terms of G.P. 2.3 sum of infinite terms of G.P. for $|r|<1$. 2.4 Definition of geometric mean. 2.5 Examples based on the above concepts.	5

3	**BINOMIAL THEOREM**
	3.1 Meaning of the term n! (Factorial n) and nCr and its simple examples
	3.2 Expansion of $(a + b)^n$, $n \in N$.
	   3.2.1 General term $T_{(r+1)}$ of $(a + b)^n$.
	   3.2.2 Examples of finding any term, middle term/terms, constant term, coefficient of X^r.
	3.3 Expansion of $(a + b)^n$, $n \in Q$.
	   3.3.1 Examples of expanding $(a + b)^n$, $n \in Q$ upto four terms.
	   3.3.2 Finding approximate value using binomial theorem.
		6

4	**DETERMINANTS AND MATRICES**	7
	4.1 Introduction of determinants of order 2 and 3.	
	4.1.1 Expansion of determinants and its examples	
	4.2 Concepts of Matrix of order m×n.	
	4.2.1 Types of Matrices.(Null matrix , Square matrix , Unit	
	matrix , Diagonal matrix , Symmetric matrix , Skew	
	symmetric matrix)	
	4.3 Scalar multiplication and addition of Matrices.	
	4.4 Product of matrices.	
	4.5 Transpose and Adjoint of a matrix.	
	4.6 Inverse of a matrix.	
	4.7 Solution of simultaneous linear equations upto three	
	variables.	
5	**VECTORS** (**NB:-This topic must be taught after completing all topics of algebra and trigonometry.)**	6
	5.1 Vector and scalar quantities	
	5.2 Types of vector.(Position vector , Equal vector , Opposite	
	vector , Coplanar vectors , Co-initial vectors)	
	5.3 Geometrical representation of vectors.	
	5.4 Addition and scalar multiplication of vectors.	
	5.5 Magnitude of vector and unit vector.	
	5.6 Direction cosines of vector and unit vectors in the direction	
	of axis.	
	5.7 Dot and Cross product of vectors.	
	5.8 Applications.(Work done by force and moment of force)	

Sr. No.	**Subject Content**	**Hrs.**
	PART – II (TRIGONOMETRY)	
1	**TRIGONOMETRIC RATIOS**	4
	1.1 Introduction of trigonometric ratios using unit circle.	
	1.2 degree and radians	
	1.3 values of T-ratios for 30°,45°,60°,90°.	
	1.4 area of sector and arc-length of circle.	
	1.5 Concept of allied angles.	
2	**COMPOUND ANGLES**	5
	2.1 Concepts of addition and subtraction of angles.	
	2.2 Sum and difference formulas.	
	2.3 factor formulas.	
3	**MULTIPLE AND SUB-MULTIPLE ANGLES**	5
	3.1 Formulas of multiples(2A and 3A) of an angle(A)	
	3.2 Formulas of sub-multiples(A/2) of an angle(A).	
4	**GRAPHS**	3
	4.1 Graphs of sine and cosine .	
5	**PROPERTIES OF TRIANGLE**	6
	5.1 sine and cosine formulas.	
	5.2 Projection formula.	
	5.3 Napiar's formula.	

	5.4 formulas of area of a triangle(Δ=(1/2)ab sinc..etc.)Relations between Δ , R , r and s.		
	5.5 Solutions of a triangle.		
6	**INVERSE TRIGONOMETRIC FUNCTIONS**		4
	6.1 Concept and definition .		
	6.2 Formulas and simples examples.		
		Total	56

REFERENCES :

(1) Engg. Mathematics   I. B. Prasad
(2) Mathematics for Polytechnic   S.P.Deshpande
(3) Technical Ganitshashtra(Part I,II in Gujarati   R.D.Desai
(4) Polytechnic Mathematics   Dr. N.R.Pandya
(5) Polytechnic Mathematics   Manjeet Singh