GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Diploma in Vocation (D.Voc.), 6th Semester
Branch: Architectural Assistantship
Subject Name: Mathematics
Subject Code: 1260604

Type of course: Core

Rationale: This course of Mathematics is being introduced as a foundation which will help students in developing competency and the requisite course outcomes in Architecture programs. The components of mathematics like algebra, geometry calculus, computer computation work as tool to describe physical phenomena and to evaluate the merits of different possible solutions. This course is an attempt to initiate multidimensional logical thinking and reasoning capabilities, helping the students to apply the basic principles of mathematics in architectural practice. The course will give the students an insight to apply and analyze the problem scientifically based on trigonometry, differential calculus, and statistics.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical		
L	T	P	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End SemesterExamination; PA- Progressive Assessment

Content:

Sr. No.	Content	Total Hrs.	Module % Weightage
1	**Determinants:** Determinants and its value up to 2nd order, Properties of determinants, solving of simple problems. Logarithm as a function – concepts, laws of logarithm and related simple logarithm.	6	15
2	**Vector:** Introduction, Unit Vector, Parallel Vectors, Coplanar Vectors, Addition, Subtraction, Magnitude, and direction. Application of the concept of Algebraic operations of Vectors to solve simple problems. Dot product, Cross product, condition of perpendicularity and parallelism. Scalar and Vector product and its properties – application of the concept to solve simple problems. Angle between two Vectors. Applications of Scalar and Vector product – solve problems of work done and moment of force using the concept of Vectors.	6	15
3	**Trigonometry:** Units of Angles – application of the concept of compound angle, allied angle Trigonometric functions Allied and compound Angles, Multiple – Submultiple angles -	6	15

	Simple problems related to the concept of Multiple and Sub multiple to be explained. Graph of Sine and Cosine		
4	**Differential Calculus:** Concept and Definition of Differentiation, types of functions, odd and even, periodic, composite, explicit, implicit and parametric functions. Application of the working rules and standard forms of differentiation to find the derivative of simple functions. Working rules: Sum, Product, Division, Chain Rule - application of concept of Chain Rule to find the derivative of simple function. Derivative of Implicit functions. Derivative of Parametric Functions. Successive Differentiation up to Second order – application of the standard forms and rules of derivative to find the second order derivative of simple functions.	9	20
5	**Integration:** Concept and definition of Integration, Integration as the inverse process of differentiation. List of formulae. Working rules and Integral of Standard functions and its application. Method of Substitution and Integration by parts – finding of the Integral of simple functions using the method of substitution Integration by algebraic fractions. Definition as the limit of a sum. Fundamental theorems on Definite Integrals. Properties of Definite Integral. Evaluation of Definite Integrals using fundamental laws and properties.	9	20
6	**Statistics:** • Measure of Central tendence – Mean for ungrouped and grouped data, Mean deviation and Standard deviation about Mean for ungrouped and grouped data. • Median and Mode. **Probability:** Permutation and combination, elementary theory of probability, conditional probability and Binomial distribution.	6	15
	Total	42	100

Reference Books:

1. B.S. Grewal, Elementary engineering mathematics, Khanna publishers.
2. M.L. Bhave, C.M. Deshpande and others, Mathematics for polytechnic, S.Chand and company ltd., New Delhi
3. Manjeet Singh, Polytechnic mathematics (mad easy) (Applied mathematics), Dhanpat Rai and Co. (P) Ltd. (2004)

4. S.P. Deshpande, Mathematics for polytechnic students, Pure Vidyarthi Gruha Prakashan,
5. Shanti Narayan, Integral Calculus, S. Chand and Company (2005)

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
5	**20**	**15**	**5**	**5**	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Createand above Levels (Revised Bloom's Taxonomy)

Course Outcomes:

Sr No	CO Statement	Marks % weightage
CO-1	To understand the application of Determinants and vector properties for solving architectural and engineering problems.	20
CO-2	To understand the application of triangles in architecture.	20
CO-3	To understand the application to find maxima and minima of applied physics.	30
CO-4	To solve problems involving area and volume through integrals and interpret geometrically.	20
CO-5	To understand the analysis of present and future condition of a case through statistics.	10

Laboratory Work:
Tutorial to be studied (1 to 5)

List of Open-Source Software / Learning website:
Students must refer to following sites to enhance their learning ability.

1. https://mathvault.ca
2. http://www.gpahmedabad.ac in