

# GUJARAT TECHNOLOGICAL UNIVERSITY

## COURSE NAME : MATHEMATICS-II

1. **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 engg. 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.

## 2. SCHEME OF TEACHING :

SN.	Topics	Theory Hours
	<b>Part-I CO-ORDINATE GEOMETRY</b>	
1.	Point	3
2.	Straight line	3
3.	Circle	3
	<b>TOTAL</b>	<b>9</b>
	<b>Part-II CALCULUS</b>	
1.	Functions & Limit	5
2.	Differentiation	13
3.	Integration	15
	<b>TOTAL</b>	<b>33</b>

**Grand Total 42 hrs.**

## 3. TOPICS AND SUB-TOPICS

### Part-I CO-ORDINATE GEOMETRY:

#### TOPIC-1 : Point

**3 hrs**

- 1.1 Distance formula for R<sup>2</sup>.
- 1.2 Circum-centre of a triangle.
- 1.3 Area of a triangle.
- 1.4 Division of a line segment.
- 1.5 Locus of point.

# GUJARAT TECHNOLOGICAL UNIVERSITY

## **TOPIC-2 : Straight line** **3 hrs**

- 2.1 Cartesian equation of a straight line.
- 2.2 Equation of a straight line in  $R^2$ :  $ax+by+c=0$ .
- 2.3 Slope of a straight line.
- 2.4 Intercepts on axis.
- 2.5 Equation of a straight line passes through two points  $(x_1, y_1)$  and  $(x_2, y_2)$
- 2.6 Equation of straight line having slope  $m$  and passing through the point  $(x_1, y_1)$ .
- 2.7 Equation of st. line having intercepts on  $y$ -axis and slope  $m$
- 2.8 Parallel and perpendicular straight line relation between their slope.
- 2.9 Angle between two straight lines.

## **TOPIC-3: CIRCLE** **3 hrs**

- 3.1 Definition of a circle
- 3.2 General equation
- 3.3 Standard equation
- 3.4 Formation of equation of a circle
- 3.5 Tangent & Normal.

## **PART-II CALCULUS**

### **TOPIC-1: Functions & Limit** **5 hrs**

- 1.1 Definition of function
- 1.2 Examples
- 1.3 Concept & rules of limit
- 1.4 Evaluation of Standard limit of algebraic & trigonometric function.

### **TOPIC-2 : Differentiation:** **13 hrs.**

- 2.1 Definition.
- 2.2 Derivation of constant function.
- 2.3 Formula:  $X^n$ ,  $a^x$ ,  $\sin x$ ,  $e^x$ , etc.
- 2.4 Formula for sum, product and quotient of functions.
- 2.5 Chain rule.
- 2.6 Derivation of parametric and Implicit functions.
- 2.7 Second order differentiation.
- 2.8 Application of derivatives.

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- (i) Velocity
- (ii) Acceleration
- (iii) Maxima and minima, radius of curvature

### TOPIC-3. Integration

15 hrs.

- 3.1 Introduction of Integration
- 3.2 Formula for standard function as mentioned in 2-3.
- 3.3 Simple basic rules of Indefinite Integration.
- 3.4 Evaluation of simple Indefinite Integrals.
- 3.5 Integration by Substitution.
- 3.6 Definite Integral
  - 3.6.1 Lower limit
  - 3.6.2 Upper limit
  - 3.6.3 Properties of definite integral
- 3.7 Solution of simple problems of definite Integral.
- 3.8 Application of Integration.
  - (1) Area & volume of circle, parabola & ellipse only.

**Grand Total 42 hrs.**

### 4. REFERENCES :

- |  |                |
|--|----------------|
| (1) Engg. Mathematics                              | P.N. Wartikar  |
| (2) Engg. Mathematics                              | B.S. Greval.   |
| (3) Engg. Mathematics                              | I. B. Prasad   |
| (4) Polytechnic Mathematics (Vol. I & II)          | TTTI Bhopal    |
| (5) College Algebra                                | Shah and Desai |
| (6) Mathematics for Polytechnic                    | S.P.Deshpande  |
| (7) Co-Ordinate Geometry                           | Bansilal       |
| (8) Technical Ganitshashtra(Part I,II in Gujarati) | R.D.Desai      |
| (9) ---do---                                       | Anant Shashtri |