

**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT  
COURSE CURRICULUM**

**Course Title: Advanced Mathematics (Group-2)  
(Code: 3320003)**

<b>Diploma Programmes in which this course is offered</b>	<b>Semester in which offered</b>
Civil Engineering, Ceramic Engineering, Environment Engineering, Mechanical Engineering, Mining Engineering,	<b>Second Semester</b>

**1. RATIONALE**

The subject is classified under Advance Mathematics and students are intended to know about the basic concepts and principles of Mathematics as a tool to analyze the Engineering problems. Mathematics has the potential to understand the Core Technological studies.

**2. LIST OF COMPETENCIES**

The course content should be taught so as to understand and perform the Engineering concepts and computations. Aim to develop the different types of Mathematical skills leading to the achievement of the following competencies.

- Select proper Mathematical tool to solve given engineering problems.
- Apply concepts of Calculus or suitable tool to analyze given Industrial situation.

**3. TEACHING AND EXAMINATION SCHEME**

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	100
2	2	0	4	70	30	0	0	

**Legends:**

**L**-Lecture; **T** ó Tutorial/Teacher Guided Theory Practice; **P** -Practical;**C** ó Credit;  
**ESE** -End Semester Examination; **PA** - Progressive Assessment.

#### 4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
<b>Unit – I</b> Co-ordinate Geometry	<p><b>1a.</b> Find the distance between two points, use Mid-Point formula for quadrilateral</p> <p><b>1b.</b> Find the equation of locus using Distance Formula</p> <p><b>1c.</b> Find the equation of line using the different forms</p> <p><b>1d.</b> Find the equation of circle</p> <p><b>1e.</b> Find Tangent and Normal to the circle</p>	<p><b>1.1 Point :</b> Distance Formula, Mid-point, Locus of a point</p> <p><b>1.2 Straight Line :</b> Forms of Equation of St Lines : Slope Point Form, Two Point Form, Intercept Form, Parallel and Perpendicular lines</p> <p><b>1.3 Circle :</b> Equation of Circle, Centre and radius form, Tangent and Normal.</p>
<b>Unit– II</b> Function & Limit	<p><b>2a.</b> Solve the problem using functions</p> <p><b>2b.</b> Solve the problem of function using the concept of Limit</p>	<p><b>2.1 Function</b> Concept and Examples</p> <p><b>2.2 Limit</b> Concept of Limit, Standard Formulae and related Examples.</p>
<b>Unit– III</b> Differentiation & Applications	<p><b>3a.</b> Differentiate the various function</p> <p><b>3b.</b> Apply the differentiation to Velocity, Acceleration and Maxima &amp; Minima</p>	<p><b>3.1 Differentiation:</b> Definition, Rules of, Sum, Product, Quotient of Functions, Chain Rule, Derivative of Implicit functions and Parametric functions, Logarithmic Differentiation. Successive Differentiation up to second order</p> <p><b>3.2 Application:</b> Velocity, Acceleration, Maxima &amp; Minima.</p>
<b>Unit– IV</b> Integration & its application	<p><b>4a.</b> Integrate the various function</p> <p><b>4b.</b> Apply the Integration for finding Area and Volume</p>	<p><b>4.1 Integration:</b> Concept, Integral of Standard Functions, Working Rules of Integration, Integration by Parts, Integration by Substitution Method, Definite Integral and its properties.</p> <p><b>4.2 Application:</b> Area and Volume.</p>
<b>Unit-V</b> Statistics	<p><b>5a.</b> Measures of Central Tendency</p> <p><b>5b.</b> Measure of Dispersion</p>	<p><b>5.1 Measures of Central Tendency</b> for Ungrouped and Grouped Data : Mean, Median and Mode</p> <p><b>5.2 Measure of Dispersion</b> for Grouped and Ungrouped data : Standard deviation</p>

### 5. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
1.	Co-ordinate Geometry	5	2	8	4	14
2.	Function & Limit	4	3	5	4	12
3.	Differentiation & its Application	8	4	8	6	18
4.	Integration & its Application	8	4	8	4	16
5.	Statistics	3	2	5	3	10
<b>Total</b>		<b>28</b>	<b>15</b>	<b>34</b>	<b>21</b>	<b>70</b>

#### Legends:

R = Remembrance; U= Understanding; A= Application and above levels (Revised Bloom's taxonomy)

### 6. SUGGESTED LIST OF EXERCISES (During tutorial hours)

The exercises should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency.

S. No.	Unit No.	Exercises/Tutorial
1	1	Co-ordinate Geometry, Practice Examples
2		
3	2	Practice Examples of Function & Limit
4		Use of Various Method/Techniques.
5	3	Differentiation and Related Examples
6		Examples Related to various Methods/Techniques
7		Identify the Engineering Applications from respective branches and solve the problems ( Also Use MathCAD and MATLAB)
8	4	Integration & Related Examples.
9		Examples Related to Various Methods/Techniques
10		Identify the Engineering Applications from respective branches and solve the problems (Also Use MathCAD and MATLAB)
11	5	Statistics, Practice Examples
12		Use Excel and solve the problems

Note: The above Tutor sessions are for guideline only. The remaining Tutorial hours are for revision and practice.

## 7. SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed student activities like: course/topic based seminars, internet based assignments, teacher guided self learning activities, course/library/internet/lab based Mini-Projects etc. These could be individual or group-based.

- 1.Applications to solve identified Engineering problems and use of Internet.
- 2.Learn graphical softwares:EXCEL,DPLLOT,GRAPH etc.
- 3.Learn MathCAD to use Mathematical Tools and solve the problems of Calculus.
- 4..Learn MATLAB and use to solve the identified problems.

## 8. SUGGESTED LEARNING RESOURCES

### A. List of Books

S.No.	Author	Title of Books	Publication
1	Anthony croft and others	Engineering Mathematics (third edition)	Pearson Education,2012
2	Pandya N R	Advance Mathematics	Macmillan Publishers India Ltd.,2012
3	Deshpande S P	Polytechnic Mathematics	Pune Vidyarthi Gruh Prakashan,1984
4	Prakash D S	Polytechnic Mathematics	S Chand,1985

### B. List of Major Equipment/ Instrument

1. Simple Calculator
2. Computer System with Printer, Internet
3. LCD Projector

### C. List of Software/Learning Websites

1. Excel
2. DPlot
- 3.Graph
- 4 MathCAD
- 5.MATLAB

You may use other Software like Mathematica and other Graph Plotting software. Use wikipedia.org, mathworld.wolfram.com Etc

## 9. COURSE CURRICULUM DEVELOPMENT COMMITTEE:

### Faculty Members from Polytechnics

- Dr.N.R.Pandya, HOD-General Dept.,Govt. Polytechnic, Ahmedabad
- Dr N A Dani,Lecturer,Govt. Polytechnic,Junagadh.
- Smt R L Wadhwa,Lect Govt Polytechnic,Ahmedabad
- Shri H C Suthar,BPTI,Bhavnagar
- Shri P N Joshi,Govt Polytechnic,Rajkot

### Coordinator and Faculty Member From NITTTR Bhopal

- Dr. P. K. Purohit, Associate Professor, Dept. of Science, NITTTR, Bhopal