

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
COURSE CURRICULUM

Course Title: Advance Mathematics (Group-2)
(Code: 3320003)

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

1. RATIONALE

The course is classified under Advance Mathematics and students are intended to understand the advance concepts and principles of Mathematics such as calculus, coordinate geometry and Statics. This knowledge is required to understand and solve engineering problems.

2. COMPETENCIES

The course content should be taught and implemented with the aim to develop different types of mathematical skills so that students are able to acquire following competencies:

- Use proper Mathematical tool to understand engineering principles and concepts.
- Apply concepts of calculus or suitable mathematical tool to solve given engineering problems.

3. TEACHING AND EXAMINATION SCHEME

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

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

Note: It is the responsibility of the institute heads that marks for **PA of theory & ESE and PA of practical** for each student are entered online into the GTU Portal at the end of each semester within the dates specified by GTU.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I Co-ordinate Geometry	<p>1a. Find the distance between two points, use Mid-Point formula for quadrilateral</p> <p>1b. Find the equation of locus using Distance Formula</p> <p>1c. Find the equation of line using the different forms</p> <p>1d . Find the equation of circle</p> <p>1e. Find Tangent and Normal to the circle</p>	<p>1.1Point : Distance Formula, Mid-point, Locus of a point</p> <p>1.2Straight Line : Forms of Equation of St Lines : Slope Point Form, Two Point Form, Intercept Form, Parallel and Perpendicular lines</p> <p>1.3 Circle : Equation of Circle, Centre and radius form, Tangent and Normal and related problems.</p>
Unit– II Function & Limit	<p>2a . Solve the problem using functions</p> <p>2b . Solve the problem of function using the concept of Limit</p>	<p>2.1 Function Concept and Examples</p> <p>2.2 Limit Concept of Limit, Standard Formulae and related Examples.</p>
Unit– III Differentiation & its Applications	<p>3a. Differentiate the various function</p> <p>3b. Apply the differentiation to Velocity, Acceleration and Maxima & Minima</p>	<p>3.1Differentiation: 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>3.2 Application: Velocity, Acceleration, Maxima & Minima.</p>
Unit– IV Integration & its application	<p>4a . Integrate the various function</p> <p>4b . Apply the Integration for finding Area and Volume</p>	<p>4.1 Integration: Concept, Integral of Standard Functions, Working Rules of Integration, Integration by Parts, Integration by Substitution Method, Definite Integral and its properties.</p> <p>4.2 Application: Area and Volume.</p>
Unit-V Statistics	<p>5a . Measure Central Tendency in given data</p> <p>5b. Measure Dispersion in given data</p>	<p>5.1 Measures of Central Tendency for Ungrouped and Grouped Data : Mean, Median and Mode</p> <p>5.2 Measure of Dispersion 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
I	Co-ordinate Geometry	5	2	8	4	14
II	Function & Limit	4	3	5	4	12
III	Differentiation & its Application	8	4	8	6	18
IV	Integration & its Application	8	4	8	4	16
V	Statistics	3	2	5	3	10
Total		28	15	34	21	70

Legends: R = Remember; U= Understand; A= Application and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as only general guideline for students and teachers. The actual distribution of marks in the question paper may vary from above table.

6. SUGGESTED LIST OF EXERCISES (During tutorial hours)

The exercises should be properly designed and implemented with an attempt to develop different types of mathematical skills so that students are able to acquire above mentioned competencies.

S. No.	Unit No.	Exercises/Tutorial
1	I	Co-ordinate Geometry, Practice Examples
2	I	Solve engineering problems using coordinate geometry
3	II	Practice Examples of Function & Limit
4	II	Use of Various Method/Techniques.
5	III	Differentiation and Related Examples
6	III	Solve problems related to various methods/techniques of differentiations
7	III	Identify the Engineering Applications from respective branches and solve the problems
8	IV	Integration & Related Examples.
9	IV	Solve problems Related to Various Methods/Techniques of integration
10	IV	Identify the Engineering Applications from respective branches and solve the problems
11	V	Statistics, Practice Examples
12	V	Use Excel and solve the problems

Note: The above Tutor sessions are for guideline only. The remaining Tutorial hours are may be used by teachers appropriately 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. Some of these may be as below:

1. Applications to solve identified Engineering problems and use of Internet.
2. Learn graphical softwares:EXCEL,DPLOT,GRAPH etc.
3. Learn MathCAD to use Mathematical Tools and solve the problems of Calculus.
4. Learn MATLAB and use it 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	Advanced Mathematics for Polytechnic	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. Math CAD
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.
- **Prof. (Smt) R L Wadhwa**, Lect Govt Polytechnic, Ahmedabad
- **Prof. H C Suthar**, BPTI, Bhavnagar
- **Prof. P N Joshi**, Govt Polytechnic, Rajkot

Coordinator and Faculty Member From NITTTR Bhopal

- **Dr. P. K. Purohit**, Associate Professor, Dept. of Applied Science
- **Dr. Deepak Singh**, , Associate Professor, Dept. of Applied Science