GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
COURSE CURRICULUM

Course Title: Advanced Mathematics (Group-1) (Code: 3320002)

Diploma Programmes in which this course is offered	Semester in which offered
Biomedical Engineering, Chemical Engineering, Electrical Engineering, Computer Engineering, Electronics & Communication Engineering, Information Technology, Power Electronics	**Second Semester**

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				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
2	2	0	4	70	30	0	0	**100**

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

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I Complex Number	**1a**.Simplify Comlex expressions **1b**.Find Modulus and Amplitude of given expressions **1c**.Find the root of complex number **1d**.Use De Moivreôs Theorem to simplify and to find roots	Concept, Modules and Amplitude form, Square Root of Complex Number, De Moivreôs Theorem for Integer *n*.
Unit– II Function & Limit	2a .Solve the problem using functions 2b .Solve the problem of function using the concept of Limit	**2.1 Function** Concept and Examples **2.2 Limit** Concept of Limit, Standard Formulae and related Examples.
Unit– III Differentiation & itôs Applications	**3a**.Differentiate the various function **3b**.Apply the differentiation to Velocity,Acceleration and Maxima & Minima	**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 **3.2 Application:** Velocity, Acceleration, Maxima & Minima.
Unit– IV Integration & its application	**4a** .Integrate the various function **4b** .Apply the Integration for finding Area and Volume	**4.1 Integration**:Concept, Integral of Standard Functions, Working Rules of Integration, Integration by Parts, Integration by Substitution Method, Definite Integral and its properties. **4.2 Application:** Area and Volume.
Unit-V Differential Equations	**1a.**Find the differentiation of the various functions **1b.**Obtain the differentiation of higher order derivatives **1c.**Apply the derivatives for Velocity, Acceleration, Maxima & Minima	**5.1** Definition, Rules of Differentiation, Sum, Product, Quotient of Functions, Chain Rule, **5.2** Derivative of Implicit functions and Parametric functions, Logarithmic Differentiation. **5.3** Successive Differentiation up to second order **5.4 Application:** Velocity, Acceleration, Maxima & Minima.

5. SUGGESTED SPRCIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
1.	Complex Number	3	2	5	3	10
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.	Differential Equations	5	2	8	4	14
Total		**28**	**15**	**34**	**21**	**70**

Legends:
R = Remembrance; U= Understanding; A= Application and above levels (Revised Bloomôs 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		Use Excel and other software for further understanding of applications
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
8	4	Integration & Related Examples.
9		Examples Related to Various Methods/Techniques
10		Identify the Engineering Applications from respective branches and solve the problems
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 STUENT 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 sofwares:EXCEL,DPLOT,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 Etcé

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