

**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT****Course Curriculum****Course Title: Applied Mathematics - II  
( Code: 3320101)**

<b>Diploma Programme in which this course is offered</b>	<b>Semester in which offered</b>
Aeronautical Engineering	Second

**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. COMPETENCY.**

Aim to develop different types of mathematical skills so that students are able to acquire following competencies:

- 1) Students will able to Use proper Mathematical tool to understand engineering principles and concepts.
- 2) Students will able to Use 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				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
03	02	00	5	70	30	00	00	

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

**4. COURSE DETAILS.**

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
<b>Unit – I Complex Number</b>	<b>1.1 Simplify Complex expressions</b> <b>1.2 Find Modulus and Amplitude of given expressions</b> <b>1.3 Use De Moivres' Theorem to simplify mathematical expressions and to find roots</b>	<b>1.1 Concept</b> <b>1.2 Modulus and Amplitude form</b> <b>1.3 Root of Complex Number</b> <b>1.4 De Moivres' Theorem.</b>

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
<b>Unit- II Function &amp; Limit</b>	<p><b>2.1</b> Solve the problem using functions</p> <p><b>2.2</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 Interpolation</b>	<p><b>3.1</b> Students will be able to solve Interpolation by Polynomials and Error</p>	<p><b>3.1</b> Newton Forward and Backward Method</p> <p><b>3.2</b> Lagrange's Divided Difference Method</p> <p><b>3.3</b> Error of Interpolating polynomial</p>
<b>Unit- IV Differentiation</b>	<p><b>4.1</b> Differentiate the various function</p> <p><b>4.2</b> Apply the differentiation to Velocity, Acceleration and Maxima &amp; Minima</p>	<p><b>4.1 Differentiation:</b> 4.1.1 Definition</p> <p>4.1.2 Rules of Sum, Product, Quotient of Functions,</p> <p>4.1.3 Chain Rule</p> <p>4.1.4 Derivative of Implicit functions and Parametric Functions</p> <p>4.1.5 Logarithmic Differentiation.</p> <p>4.1.6 Successive Differentiation up to second order</p> <p><b>4.2 Application:</b> <b>4.2.1</b> Velocity, Acceleration</p> <p>4.2.2 Maxima &amp; Minima.(simple problems)</p>
<b>Unit- V Integration &amp; its application</b>	<p><b>5.1</b> Integrate the various function</p> <p><b>5.2</b> Apply the Integration for finding Area and Volume</p>	<p><b>5.1 Integration:</b> 5.1.1 Concept</p> <p>5.1.2 Integral of Standard Functions</p> <p>5.1.3 Working Rules of Integration</p> <p>5.1.4 Integration by Parts</p> <p>5.1.5 Integration by Substitution Method</p> <p>5.1.6 Definite Integral and its properties.</p> <p><b>5.2 Application:</b> <b>5.2.1</b> Area and Volume.(simple problems).</p>
<b>Unit-VI Differential Equations</b>	<p><b>6.1</b> Find the Order and Degree of a Differential Equation.</p> <p><b>6.2</b> Form a Differential Equation for simple Engineering problems</p> <p><b>6.3</b> Solve Differential Equations using Variable Separable, Homogeneous and Integrating Factor methods.</p>	<p><b>6.1</b> Definition, Order and Degree of Differential Equation</p> <p><b>6.2</b> Formation of DE</p> <p><b>6.3</b> Solution of DE of First Degree and First Order by Variable Separable, Homogeneous and Integrating Factor methods.</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 Marks
I	Complex Number	06	2	5	3	10
II	Function & Limit	06	4	4	4	12
III	Interpolation	08	4	4	4	12
IV	Differentiation & its application	08	4	4	6	14
V	Integration & its application	08	4	4	4	12
VI	Differential Equations	06	2	5	3	10
<b>Total</b>		<b>42</b>	<b>20</b>	<b>26</b>	<b>24</b>	<b>70</b>

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

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

General Notes:

- If midsem test is part of continuous evaluation, unit numbers I and II are to be considered.
- Ask the questions from each topic as per marks weightage. Numerical questions are to be asked only if it is specified. Optional questions must be asked from the same topic.
- In examination, example of same chapter is to be asked in place of example.

**6. SUGGESTED LIST OF EXERCISES(During tutorials hours)**

Sr. No.	Unit No.	Practical Exercises (outcomes in Psychomotor Domain)
1	1	Co-ordinate Geometry, Practice Examples
2		Solve engineering problems using coordinate geometry
3	2	Complex Number, Practice Examples
4	3	Practice Examples of Function & Limit
5		Use of Various Method/Techniques of Limit
6	4	Differentiation and Related Examples
7		Solve problems related to various methods/techniques of differentiations
8		Identify the Engineering Applications from respective branches and solve the problems
9	5	Integration & Related Examples.
10		Solve problems Related to Various Methods/Techniques of integration
11		Identify the Engineering Applications from respective branches and solve the problems
12	6	Identify the corresponding Engineering Applications for differential equations

		from respective branches and solve the problems.
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Notes: 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. Tutorials to do more practice of different 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	S P Deshpande	Polytechnic Mathematics	Pune Vidyarthi Gruh Prakashan
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

## 9. COURSE CURRICULUM DEVELOPMENT COMMITTEE:

**Faculty Members from Polytechnics**

**Coordinator and Faculty Member From NITTTR Bhopal**