GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum

Course Title: Applied Mathematics - 1
(Code: 3316302)

Diploma Programme in which this course is offered	Semester in which offered
Agriculture Engineering	First

1. RATIONALE

Students are intended to know about the basic concepts and principles of mathematics as a tool to analyze the Engineering Problem. Mathematics has the potential to understand the Core Technological studies.

2. COMPETENCY

Aim to develop the different types of mathematical skills leading to the achievement of the competencies:
Students will be able to apply the concepts and principles of mathematics to solve simple 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	100
02	02	00	4	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
Unit – I Algebra	**1.1** Students will be able to solve simple problems Using concepts of Permutation and Combination **1.2** Students will be able to solve simple problems Using concepts of Binomial Theorem	**1.1.1** Definition of Permutations and Combinations **1.1.2** Value of n_{pr} and n_{Cr} , its properties and simple Problems. **1.2.1** Binomial theorem (without proof) for positive integral index (expansion and general term) **1.2.2** Binomial theorem for any index (expansion only) first and second binomial approximation with application to engineering problems. **1.3.1** Partial fractions :linear factors

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
	1.3 Students will be able to solve simple problems Using concepts of Partial Fractions **1.4** Students will be able Solve simultaneous equations using concepts of Determinants and Matrices **1.5** Students will be able to solve simple problems Using concepts of Logarithm	**1.3.2** Repeated linear factors **1.3.3** Non reducible quadratic factors. **1.4.1** Determinants and Matrices - expansion of determinants (up to third order) using sarrus rule, expansion method **1.4.2** Pivotal's condensation method. **1.4.3** Properties of determinants, solution of equations (up to 3 unknowns) by Cramer's rule. **1.4.4** Definition of matrix, addition, subtraction and multiplication of matrices (up to third order). **1.4.5** Inverse of a matrix by adjoint method and elementary row transformations. **1.4.6** Solution of equations (up to 3 unknowns) by Matrix method. **1.5.1** Logarithm: general properties of logarithms **1.5.2** Calculations of engineering problems using log tables.
Unit– II Trigonometry	**2.1** Students will be able Solve simple problems using concepts of Trigonometry **2.2** Students will be able Solve simple Triangle problems using concepts of Trigonametry	**2.1.1** Addition and subtraction formulae **2.1.2** Product formulae and their application in engineering problems. **2.1.3** Transformation from product to sum or difference of two angles or vice versa **2.1.4** Multiple and Submultiple angles **2.2.1** Conditional identities **2.2.2** Solution of triangles (excluding ambiguous cases).
Unit– III Vectors	**3.1** Students will be able Solve simple problems using concepts of Vectors	**3.1.1** Definition of vector and scalar quantities. **3.1.2** Addition and subtraction of vectors. **3.1.3** Dot product and cross product of two vectors. **3.1.4** Thumb rule. **3.1.5** Angle between two vectors **3.1.6** Application of dot and cross product in engineering problems **3.1.7** Scalar triple product and vector triple product
Unit– IV Complex Numbers	**4.1** Student will able to simplify Complex Expressions **4.2** Student will able to find Modulus and Argument of given expressions	**4.1.1** Definition, Real and Imaginary parts of a complex number **4.1.2** Polar and Cartesian representation of a complex number and conversion from one form to the other **4.1.3** Addition, Subtraction, Multiplication and Division of a complex number **4.2.1** Conjugate of a complex number, Modulus and Argument of a complex number

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
Unit– V Statistics & Probability	**5.1** Students will be able Solve simple problems using concepts of Measure Dispersion in given data **5.2** Students will be able Solve simple problems Of Comparative Data **5.3** Students will be able Solve simple problems of Probability Distribution & its Application	**5.1.1** Evaluation of standard deviation and process capabilities. **5.2.1** Rank, Rank correlation, **5.3.1** Probability: definition and laws on probability **5.3.2** Concept of random variable **5.3.3** Probability distribution (Binomial, Poisson and Normal) and their applications. **5.3.4** Drawing control charts for average 1X) and range (R)

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

Unit No.	Unit Title	Teaching Hours 28	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	**Algebra**	7	6	6	6	18
II	**Trigonometry**	7	8	6	4	18
III	**Vectors**	4	2	4	4	10
IV	**Complex Numbers**	4	4	2	4	10
V	**Statistics & Probability**	6	6	4	4	14
Total		**28**	**26**	**22**	**22**	**70**

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.

6. SUGGESTED LIST OF EXERCISES (During tutorials hours)

Sr. No.	Unit No.	Practical Exercises (outcomes in Psychomotor Domain)	Teaching Hours
1	1	Permutation & Combination : Simple Examples	02
2	1	Binomial Theorem : Simple Examples related Definition	02
3	1	Examples based on binomial approximation with application to engineering problems	02
4	1	Partial Fractions: Simple Examples	01
5	1	Determinants, Simple Examples on Matrix Addition/Subtraction and Product	02
6	1	Co-factors, Adjoint and Inverse of Matrix using adjoint method & elementary row transformation	02
7	1	Solution of Equation using 3X3 Matrix and its Applications and also using Cramers Rule	02

8	1	Logarithms-Simple Examples related Definition and Rules	01
9	2	Practice Examples: Allied & Compound Angles	01
10	1	Practice Examples: Sum/Diff and factor formulae.	02
11	2	Practice Examples : Solution of triangles	02
12	3	Practice Examples of Vectors	01
13	3	Example related to Dot and Cross Products and Applications	02
14	4	Complex Number: Practice Examples	02
15	5	Statistics : Practice Examples	02
16	5	Probability : Examples of Comparative data and probability distribution	02
		Total	28

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, and 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

Sr.No.	Author	Title of books	Publication
1	SS Sabharwal and others	Applied Mathematics Vol-1	Eagle prakashan
2	SS Sabharwal and others	Applied Mathematics Vol-2	Eagle prakashan
3	W R Neelkanth	Applied Mathematics-I	Sapna Publication
4	S P Deshpande	Polytechnic Mathematics	Pune Vidyarthi Gruh Prakashan

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