

**Name of Programme** : CE/EE/ET/ME/MT/CM/IT Engineering  
**Programme Code** : 01/02/03/04/05/06/07/21/22/23/24/26  
**Name of Course** : APPLIED MATHEMATICS I  
**Course Code** : SC181

**Teaching Scheme:**

	Hours / Week	Total Hours
Theory	03	48
Term work / Practical	01	16

**Evaluation:**

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests of 60 min. duration	03 Hrs	--	--	--
Marks	20	80	--	--	--

**Rationale:**

The students of Diploma in Engineering and technology must acquire some essential Competencies in Mathematics.

**Course Outcomes:**

**After completing this course students will be able to**

1. Think logically and systematically.
2. Learn the importance of accuracy and develop attitude of problem solving with diligence and perseverance.
3. Use the basic principles of algebra to solve the engineering problems.
4. Use the basic principles of trigonometric in various engineering practices.
5. Apply coordinate geometry principles in the design and practices in engineering tools.

**Course Contents: (Course Name: Applied mathematics I – SC181)**

**A. Theory :**

Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
<b>Units 1 : Algebra</b>		<b>18</b>
1. Solve the examples using laws of logarithm 2. Solve simultaneous equations in three variables using Cramer's rule 3. Perform all algebraic operations on matrices. 4. Solve simultaneous equations in three variables using adjoint matrix method. 5. Find partial fraction of proper and improper fraction. 6. Define binomial expansion & general term 7. Solve examples using binomial theorem.	1.1 Logarithm: Definition, Laws of Logarithms, Simple examples based on laws. 1.2 Determinant : Determinants of second and third orders, solution of simultaneous equations in two and three unknowns (Cramer's Rule), Properties of determinants of order 3 and examples. 1.3 Partial fraction: Rational fractions, resolving given rational fraction into partial fraction (Type : Denominator containing non-repeated, repeated linear factors and non repeated quadratic factor) 1.4 Matrices : Definition of a matrix, types of matrices, Equal matrices, Addition, subtraction, multiplication of matrices. Scalar multiple of a matrix. Transpose of a matrix, Singular and Non singular matrix. Adjoint of a square matrix. Inverse of a matrix. Solution of simultaneous linear equations in 3 unknowns by Adjoint method. 1.5 Binomial expansion : Definition of factorial notation, definition of permutation and combinations with formula, Binomial theorem for positive index, General term, Binomial theorem for negative index, Approximate value (only formula)	
<b>Unit 2: Trigonometry</b>		<b>20</b>
1. Define basic trigonometric terms 2. Determine values of trigonometric ratios of standard angles. 3. Solve examples of allied angle, compound angle, multiple and sub-multiple angles. 4. Solve examples using factorization and de-factorization formulae 5. Solve examples of inverse trigonometric ratios	2.1 Trigonometric ratios and fundamental identities. 2.2 Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), submultiples angle. 2.3 Sum and product formulae. 2.4 Inverse Circular functions. (definition and simple problems)	
<b>Unit 3: Co ordinate geometry</b>		<b>10</b>
1. Define slope , various forms of equation of straight line. 2. Find slope and intercepts of straight line 3. Find Angle between two straight lines 4. Define condition of Parallel and Perpendicular lines 5. Define various forms of equation of circle 6. Solve problems with given condition	3.1 Straight Line: Slope and intercept of straight line. Equation of straight line in slope point form, slope-intercept form, two-point form, two-intercept form, normal form. General equation of line. Angle between two straight lines. Condition of Parallel and Perpendicular lines. Intersection of two lines. Length of perpendicular from a point on the line and perpendicular distance between parallel lines. 3.2 Circle: Equation of circle in standard form, Centre-radius form, Diameter form, two intercept form. General equation of a circle and its centre & radius.	

**B. List of Practicals /Laboratory Experiences/Assignments:**

Practical No.	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Examples on laws of logarithm	<b>Algebra</b>	1
2.	Examples on expansion of order 2& 3 determinant and solution of simultaneous equation by Cramer's rule		1
3.	Examples on Proper and Improper partial fraction		1
4.	Examples on algebra of matrices.		1
5.	Examples on Adjoint, Inverse of matrix and solution of simultaneous equations by adjoint method		1
6.	Examples on Binomial expansion and general term in expansion.		1
7.	Examples on Trigonometric ratios and fundamental identities.	<b>Trigonometry</b>	1
8.	Examples on allied angles, compound angles, multiple angles (2A, 3A), submultiples angle.		1
9.	Examples on Sum and product formulae		1
10.	Examples on Inverse trigonometric function		1
11.	Examples on straight line.	<b>Co ordinate geometry</b>	1
12.	Examples on Circle		1
		Skill Test	02
		<b>Total Hrs.</b>	<b>14</b>

**Instructional Strategy:**

Sr.No	Topic	Instructional Strategy
1	Algebra	Class room teaching , chalk board
2	Trigonometry	Class room teaching , chalk board
3	Co ordinate geometry	Class room teaching , chalk board

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Specification Table for Theory Paper:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Algebra	08(04)	16(08)	08(04)	32(16)
02	Trigonometry	08(04)	16(08)	08(04)	32(16)
03	Co ordinate geometry	04(02)	08(04)	04(02)	16(08)
	<b>Total</b>	<b>20(10)</b>	<b>40(20)</b>	<b>20(10)</b>	<b>80(40)</b>

Question Paper Profile For Theory Paper:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	U	4	1	A	4	1	U	4	1	U	4	1	U	4	1	U	4	4/6
02	1	U	4	1	A	4	1	A	4	2	R	4	2	U	4	2	U	4	4/6
03	2	U	4	2	U	4	2	U	4	2	U	4	2	A	4	2	A	4	4/6
04	3	R	4	3	U	4	3	U	4	3	U	4	3	A	4	3	R	4	4/6
05	1	R	2	1	R	2	1	R	2	1	R	2	1	R	2	1	R	2	8/12
	2	R	2	2	R	2	2	R	2	2	R	2	3	A	2	3	R	2	

T= Unit/Topic Number

L= Level of Question

M = Marks

R-Remember

U-Understand

A-Analyze/ Apply

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## Assessment and Evaluation Scheme:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	20	--	Test Answer sheets	1,2,3,4,5
		Class Room Assignments		Assignments	--	--	Assignment Book	1,2,3,4,5
				TOTAL	20	=		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	80	28	Theory Answer sheets	1,2,3,4,5
Direct Assessment Practical	CA (Continuous Assessment)	--	Students	--	--	--	--	--
		--		--	--	--	--	--
	TEE (Term End Examination)	--	Students	--	--	--	--	--
Indirect Assessment	Student Feedback on course		Students	After First PT	Student feedback form			
	End Of Course			End Of The Course	Questionnaires			

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**Scheme Of Practical Evaluation:**

S.N.	Description	Max. Marks
1	Observations,	N.A.
2	Calculations and Result	N.A.
3	Viva voce	N.A.
	<b>TOTAL</b>	

**Mapping Course Outcomes With Program Outcomes:**

Course Outcomes	Program Outcomes (POs)									
	1	2	3	4	5	6	7	8	9	10
1	3	3	2	1	2	1	2	3	2	2
2	3	3	2	1	2	1	2	3	2	2
3	3	2	2	1	1	1	2	2	1	2
4	3	3	3	2	1	1	2	2	1	1
5	3	2	3	2	1	1	2	2	1	1
6										

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

**Reference & Text Books:**

S.N.	Title	Author, Publisher, Edition and Year of publication	ISBN Number
1	Mathematics for Polytechnic Students	Pune Vidyarthi Griha , Shri S.P. Deshpande	
2	Plane Trigonometry	Macmillan and London , Shri S.L. Loney	
3	Mathematics for Engineers ( Vol.I)	S.Chand and Comp. , Shri H.K. Dass	
4	Engg. Maths Vol.I and II	S. Chand and Comp. Shri hantinarayan	

**List Of Experts & Teachers Who Contributed For This Curriculum:**

<b>S.N</b>	<b>Name</b>	<b>Designation</b>	<b>Institute / Industry</b>
1.		Chairman PBOS	
2.	Shri V.B.Shinde	Faculty from Institute	Govt.Polytechnic Pune
3.		Faculty from Institute	
4.		Consultant from Industry	
5.		Faculty from nearby Institute	
6.		R.B.T.E.Representative	

**Prepared by**

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