

**Name of Programme** : CE/ME/MT Engineering  
**Programme Code** : 01/04/05  
**Name of Course** : APPLIED MAHEMATICS III  
**Course Code** : SC281

**Teaching Scheme:**

	Hours / Week	Total Hours
Theory	02	32
Term work / Practical	01	16

**Evaluation:**

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

**Rationale:**

- Applied mathematics is designed for its applications in engineering and technology
- The student shall learn various techniques in integration and differential equations and use these techniques to their related Engineering problems.

**Course Outcomes:**

After completing this course students will be able to

1. Apply the definition of integration as inverse of differentiation to solve problems.
2. Apply various methods of integration..
3. Apply Mathematical principle to solve engineering problems.
4. Apply differential equation for solving problems in different engineering fields.
5. Apply the knowledge of probability to solve the examples related to the production process.
6. Draw and come to a valid conclusion.
7. Locate the exceptional and critical points in an engineering system.

**Course Contents: (Course Name: Applied mathematics III – SC281)**

**A. Theory :**

<b>Specific Learning Outcomes (Cognitive Domain)</b>	<b>Topics and subtopics</b>	<b>Hrs</b>
<b>Units 1 : Integration</b>		<b>10</b>
1. Define integration as anti derivative. 2. Integrate function using different method	1.1 Definitions, standard formulae, integration of algebraic sum of two or more functions, integration by substitutions and by trigonometric transformations, integration of $1/ax^2+bx+c$ , $1/\sqrt{ax^2+bx+c}$ , integration by parts, integration by partial fractions.	
<b>Unit 2: Definite integrals</b>		<b>04</b>
1 Solve problems on definite integrals using the properties	2.1 Definition and properties of definite integrals Example based on these properties.	
<b>Unit 3: Applications of integration</b>		<b>04</b>
1 Find area under the curve and between the curves. 2. Find Volume of solid of revolution	3.1 Area under the curve and area between two curves. Volume of solid of revolution.	
<b>Unit 4: Differential Equations</b>		<b>05</b>
1. Define order and degree of differential equation 2. Solve the differential equation of first order and first degree 2. Solve different engineering problems using differential equation	4.1 Definition, order and degree of differential equations. Formation of differential equations. Solution of differential equations : (using following methods) i) Variable separable (ii) Reducible to variable separable. (iii) Homogeneous differential equations. (iv) Exact diff. equations. (v) Linear differential equations.	
<b>Unit 5: Statistics</b>		<b>05</b>
1. Find mean , median, mode of any data 2. Find the range, mean deviation, standard deviation and consistency of any data	5.1– <u>Measures of central tendency</u> : (a) Mean (b) Median (c) Mode <u>Measures of dispersion</u> : a) Standard deviation (b) Co-efficient of variance	
<b>Unit 6: Probability</b>		<b>04</b>
1. Define Probability 2. Define addition and multiplication theorems . 3. Solve different engineering problems related to probability process	6.1 Defination of Random experiment, sample space, event, occurrence of events and types of events-(impossible, mutually exclusive, exahastive, equally likely) Defination of probability ,addition and multiplication theorems of probability.	
<b>Total Hrs.</b>		<b>32</b>

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

Practical No.	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Integration based on standard formulae.	Integration	1
2.	Integration by substitution method		1
3.	Integration on the type $1/ax^2+bx+c$ , $1/\sqrt{ax^2+bx+c}$ , $1/a\sin x+b\cos x+c$ , $1/a\sin^2 x +b\cos^2 x +c$ .		1
4.	Integration using By Part Rule and integration by partial fraction method.		1
5	Examples on Definite integral and it's properties	Definite integrals.	1
6.	Examples on Mean and R.M.S. value	Applications of integration	1
7.	Examples on order ,degree and formation of differential equation.	Differential Equation	1
8.	Solution of first order first degree D.E. using various methods.		1
9.	Examples on measures of central tendency ( mean , median , mode )	Statistics	1
10	Examples on measures of dispersion ( Standard deviation , coefficient of variance)		1
11	Examples on event and probability.	Probability	1
12	Examples on addition and multiplication theorem of probability.		1
	Skill Test		02
		<b>Total Hrs.</b>	<b>14</b>

**Instructional Strategy:**

Sr.No	Topic	Instructional Strategy
1	Integration	Class room teaching , chalk board
2	Definite Integrals	Class room teaching , chalk board
3	Applications of integration	Class room teaching , chalk board
4	Differential Equation	Class room teaching , chalk board
5	Statistics	Class room teaching , chalk board
6	Probability	Class room teaching , chalk board

## Specification Table for Theory Paper:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Integration	08(04)	16(08)	00(00)	24(12)
02	Definite Integrals	04(04)	04(00)	00(00)	08(04)
03	Applications of integration	00(00)	00(00)	08(04)	08(04)
04	Differential Equation	04(00)	08(04)	04(04)	16(08)
05	Statistics	04(04)	04(02)	04(00)	12(06)
06	Probability	04(02)	04(04)	04(00)	12(06)
	<b>Total</b>	<b>24(14)</b>	<b>36(18)</b>	<b>20(08)</b>	<b>80(40)</b>

R-Remember

U – Understand

A – Analyze / Apply

## 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	R	4	1	R	4	1	U	4	1	U	4	1	U	4	1	U	4	4/6
02	1	U	4	2	R	4	2	R	4	2	U	4	3	A	4	3	A	4	4/6
03	4	R	4	4	U	4	4	U	4	4	U	4	4	A	4	4	A	4	4/6
04	5	R	4	5	R	4	5	R	4	6	A	4	6	U	4	6	A	4	4/6
05	1	R	2	1	R	2	1	U	2	1	U	2	3	A	2	3	A	2	8/12
	5	U	2	5	U	2	5	U	2	6	R	2	6	R	2	6	R	2	

T= Unit/Topic Number

L= Level of Question

M = Marks

R-Remember

U-Understand

A-Analyze/ Apply

**(Course Name: Applied mathematics III – SC281)**

**Assessment and Evaluation Scheme:**

	<b>What</b>		<b>To Whom</b>	<b>Frequency</b>	<b>Max Marks</b>	<b>Min Marks</b>	<b>Evidence Collected</b>	<b>Course Outcomes</b>
<b>Direct Assessment Theory</b>	<b>CA</b> (Continuous Assessment)	PT	Students	Two PT (average of two tests will be computed)	20	--	Test Answer sheets	1,2,3,4,5,6,7
		Class Room Assignments		Assignments	--	--	Assignment Book	1,2,3,4,5,6,7
				TOTAL	20	--		
<b>TEE</b> (Term End Examination)	End Exam	Students	End Of the Course	<b>80</b>	<b>28</b>	Theory Answer sheets	1,2,3,4,5,6,7	
<b>Direct Assessment Practical</b>	<b>CA</b> (Continuous Assessment)	--	Students	--	--	--	--	--
		--		--	--	--	--	
<b>TEE</b> (Term End Examination)	:	Students	--	--	--	--	--	
<b>Indirect Assessment</b>	Student Feedback on course		Students	After First PT	Student feed back form			
	End Of Course			End Of The Course	Questionnaires			

(Course Name: Applied mathematics III – SC281)

**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	1	1	1	3	1	2
2	3	3	2	1	1	1	1	2	1	2
3	3	2	3	2	1	1	2	2	1	3
4	3	2	3	2	1	1	2	2	1	3
5	3	2	3	2	1	1	2	2	1	3
6	3	2	2	1	1	1	2	2	2	1
7	2	2	2	1	1	1	2	2	2	1

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	Higher Engineering Mathematics	Khanna Publishers, New Delhi Grewal B.S	
2	Engineering Mathematics Vol.II	Satya Prakashan, New Delhi Vishwanath	
3	Mathematics for Polytechnic students	Pune Vidyarthi Griha Prakashan S.P. Deshpande	
4	Engineering Mathematics Part II	S. Chand & Co. Ltd. Delhi ,H.K. Dass	

**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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**(Member Secretary PBOS)**

**(Chairman PBOS)**