



# Indra Ganesan

## COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai  
Accredited by NAAC with 'B+' Grade, 2(f) & 12B Status Institution by UGC

IG Valley, Madurai Main Road, Manikandam, Tiruchirappalli - 620012

# NAAC DOCUMENTS

## QUALITY INDICATOR FRAME WORK

### CRITERION – 1

## CURRICULAR ASPECTS

SUBMITTED BY

# IQAC

INTERNAL QUALITY ASSURANCE CELL

## INDRA GANESAN COLLEGE OF ENGINEERING





# Indra Ganesan

**COLLEGE OF ENGINEERING**

Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 012

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NAAC Accredited, 2(F) Status Institution by UGC



**Criteria1**

**CurricularAspects**

**100**

## 1.1 CurricularPlanningandImplementation(20)

**1.1.1 TheInstitutionensureseffectivecurriculumplanninganddeliverythroughawell-plannedanddocumentedprocessincludingAcademiccalendarandconductofcontinuousinternalAssessment**

### TableofContent

S.No	Description
1.	PrefaceoftheCourseFile
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**INDRA GANESAN COLLEGE OF ENGINEERING**  
(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

**DEPARTMENT OF SCIENCE AND HUMANITIES**

**REVIEW OF COURSE FILE**

(to be pasted on the inner side of the file-backside). (#-State Yes/No.)

S.No	Details	R-I-*	R-II- *&	R-III- *&	R-IV- *&\$	R-V- *&\$ @
1	Preface of the course file	Y				
2	Vision, mission, PEOs,POs,PSO, Blooms taxonomy	Y				
3	Subject handlers of yesteryears	Y				
4	Time table/workload of the staff- Distribution of teaching load- Roles and Responsibilities	Y				
5	Syllabus signed by staff & HOD	Y				
6	Lecture schedule signed by staff & HOD	Y				
7	Course committee meeting circular and minutes	Y				
8	Identification of curricular gap and content beyond the syllabus	Y				
9	Self-study topics	Y				
10	Previous AU question papers	Y				
11	Unit wise Q&A and Objective type questions	Y				
12	Unit wise course material		Y	Y	Y	
13	Assignment question paper with sample answer sheet and mark entry		Y	Y	Y	
14	Tutorial question paper with key and mark entry		Y	Y	Y	
15	Class test/IA test Q Paper with Key and mark entry		Y	Y	Y	
16	IA Test- result analysis- CAP- evidence-root cause analysis		Y	Y	Y	
17	Retest - Q paper - attendance mark		Y	Y	Y	
18	AU web portal entry		Y	Y	Y	
19	Very poor performance in fast two tests-action taken.- communication to parents-evidence.			Y	Y	
20	Absence of two test-action taken-communication to parents.			Y	Y	
21	Indiscipline of student reported, if any			Y	Y	
22	Special class/coaching class/remedial class/attendance-CAP		Y	Y	Y	
23	Conduct of seminar, Quizzes-Proof					
24	Conduct beyond the syllabus-Proof					Y
25	Student feedback on faculty					Y
26	Course end survey					Y
27	Internal Assessment sheet					Y
28	AU question paper with students feedback					Y
29	Discrepancy of the question paper and correspondence, if any					Y
30	AU result analysis- details of arrear students					Y
31	AU grade sheen					Y
32	CO-PO & PSO attainment sheet					Y
	<b>Signature of Course handling faculty</b>	<i>S. Balan</i>	<i>S. Balan</i>	<i>S. Balan</i>	<i>S. Balan</i>	<i>S. Balan</i>
	<b>Signature of HOD</b>	<i>S. Balan</i>	<i>S. Balan</i>	<i>S. Balan</i>	<i>S. Balan</i>	<i>S. Balan</i>

# INDRAGANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012,  
India (Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-  
25)

~~DEPARTMENT OF SCIENCE AND HUMANITIES~~

## PREFACE OF THE COURSE FILE

Batch : 2018-2022

Academic Year : 2020 - 2021/ODD


Program : MATHEMATICS

Year & Semester : 1<sup>st</sup> Year / 1<sup>st</sup> Semester


Course Code : MA8151                      NBACourse Code: 31004

Name of the Course : ENGINEERING MATHEMATICS

Faculty in-charge : Mrs. Poonkodi

  
Signature of the Faculty in-charge

  
HoD/S & H

  
Dr. G. Balakrishnan, M.E., Ph.D.,  
Principal  
Indra Ganesan College of Engineering  
IG Valley, Madurai Main Road  
Manikandam, Trichy-620 012.





# Indra Ganesan College of Engineering

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## Department of Mathematics (S & H)

WorkLoad-ODDSemester2020 - 2021

S.NO.	Teacher'sName	CourseCode	CourseName	Semester	Lecture/week
1	DR. ANITHA S	MA8151	ENGINEERING MATHEMATICS	I/AI&DS	6
		BA4201	STATISTICS FOR MANAGEMENT STUDIES	MBA	6
2	DR. ANITHA S	MA8151	ENGINEERING MATHEMATICS	I/AGRI	6
3	MRS. YAMUNA DEVI N	MA8151	ENGINEERING MATHEMATICS	I/ECE	6
			ENGINEERING MATHEMATICS	I/MECH	
			ENGINEERING MATHEMATICS	I/EEE	
4	DR. ANITHA S	MA8151	ENGINEERING MATHEMATICS	I/IT	6
5	MRS. YAMUNA DEVI N	MA8151	ENGINEERING MATHEMATICS	I/CSE	6

Dr. G. Balakrishnan, M.D. P.

Principal

Indra Ganesan College of Engineering  
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**OBJECTIVES :**

The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

**UNIT I DIFFERENTIAL CALCULUS 12**  
Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

**UNIT II FUNCTIONS OF SEVERAL VARIABLES 12**  
Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

**UNIT III INTEGRAL CALCULUS 12**  
Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

**UNIT IV MULTIPLE INTEGRALS 12**  
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

**UNIT V DIFFERENTIAL EQUATIONS 12**  
Higher order linear differential equations with constant coefficients - Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients - Method of undetermined coefficients.

**TOTAL : 60 PERIODS****OUTCOMES :**

After completing this course, students should demonstrate competency in the following skills:

- Use both the limit definition and rules of differentiation to differentiate functions.
- Apply differentiation to solve maxima and minima problems.
- Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
- Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
- Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
- Apply various techniques in solving differential equations.

**TEXT BOOKS :**

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43<sup>rd</sup> Edition, 2014.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7<sup>th</sup> Edition, New Delhi, 2015. [For Units I & III - Sections 1.1, 2.2, 2.3, 2.5, 2.7(Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1(Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

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**DEPARTMENT OF SCIENCE AND HUMANITIES**

**Lecture Schedule**

Degree/Program: **B.E/B. TECH**

Course code & Name: **MA8151 – ENGINEERING  
MATHEMATICS**

Duration: **2017-21 (ODD)**

Semester: **I** Faculty: **Mrs. Poonkodi**

**OBJECTIVES:**

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.
- To make the student with several variables.

**COURSE OUTCOMES:**

Upon successful completion of the course, students should be able to:

CO	Course Outcomes	POs	PSOs
CO1	Use the matrix algebra methods for solving practical problems	1,2,3,4,5,9,11, 12	-
CO2	Apply differential calculus tools in solving various application problems	1,2,3,4,5,9,11, 12	-
CO3	Able to use differential calculus ideas on several variable functions	1,2,3,4,5,9,11, 12	-
CO4	Apply different methods of integration in solving practical problems	1,2,3,4,5,9,11, 12	-
CO5	Apply multiple integral ideas in solving areas, volumes and other practical problems	1,2,3,4,5,9,11, 12	-
CO6	Techniques to get a knowledge of Engineering applications	1,2,3,4,5,9,11, 12	-

S.No	Period	Topics to be covered	Reference/Teaching aids and methods	Planned date
<b>UNIT I - DIFFERENTIAL CALCULUS</b>				
1	1	Representation of functions	T2,R2/BB	05.07.2018
2	1	Limit of a function	T2,R2/BB	06.07.2018
3	5	continuity	T2,R2/BB	09.07.2018
4	6	Derivatives and Rates of Change	T2,R2/BB	10.07.2018
5	3	Trigonometric functions	T2,R2/BB	11.07.2018



6	1	The chain rule	T2,R2/BB	12.07.2018
7	1	Implicit Differentiation	T2,R2/BB	13.07.2018
8	5	Derivatives of hyperbolic functions	T2,R2/BB	16.07.2018
9	5	Inverse hyperbolic functions	T2,R2/BB	17.07.2018
10	6	Differentiation of inverse hyperbolic functions	T2,R2/BB	18.07.2018
11	2	Maximum and minimum values Theorem	T2,R2/BB	19.07.2018
12	4	Mean value Theorem	T2,R2/BB	20.07.2018
<b>UNITII –FUNCTIONS OF SEVERAL VARIABLES</b>				
13	1	Introduction	T2,R2/BB	23.07.2018
14	1	Euler's Theorem for Homogeneous Function	T2,R2/BB	24.07.2018
15	3	Total Differential Coefficient	T2,R2/BB	25.07.2018
16	5	Differentiation from Implicit Function	T2,R2/BB	26.07.2018
17	1	Jacobians	T2,R2/BB	27.07.2018
18	1	Taylor's series for functions of Two variables	T2,R2/BB	30.07.2018
19	5	Taylor's series related problems	T2,R2/BB	31.07.2018
20	5	Maxima and Minima for the functions of Two variables	T2,R2/BB	01.08.2018
21	6	Maxima and Minima related problems	T2,R2/BB	02.08.2018
22	6	Method of Lagrangian multiplier	T2,R2/BB	03.08.2018
23	2	Lagrangian multiplier related problems	T2,R2/BB	06.08.2018
24	5	Applications	T2,R2/BB	07.08.2018
<b>UNITIII- INTEGRAL CALCULUS</b>				
25	1	The Area Problem	T1,R1/BB	08.08.2018
26	5	The Definite Integral	T1,R1/BB	09.08.2018
27	6	The Fundamental Theorem of Calculus	T1,R1/BB	10.08.2018
28	1	Indefinite Integrals	T1,R1/BB	13.08.2018
29	1	Methods of Integration	T1,R1/BB	14.08.2018
30	5	Integration by parts	T1,R1/BB	15.08.2018
31	6	Trigonometric Substitution	T1,R1/BB	16.08.2018
32	5	Trigonometric Integrals	T1,R1/BB	17.08.2018
33	5	Integration by Parts	T1,R1/BB	20.08.2018
34	1	Trigonometric Integrals	T1,R1/BB	21.08.2018



35	4	Integration of Rational Functions by Partial Fractions	T1,R1/BB	22.08.2018
36	2	Improper Integrals	T1,R1/BB	23.08.2018
<b>UNITIV- MULTIPLE INTEGRALS</b>				
37	1	Double Integration in Cartesian Co-Ordinates	T1,R1/BB	04.09.2018
38	1	Double Integration in Polar Co-Ordinates	T1,R1/BB	05.09.2018
39	3	Change of order of Integration	T1,R1/BB	06.09.2018
40	5	Change of variables between Cartesian and Polar Co-Ordinates	T1,R1/BB	07.09.2018
41	5	Double Integration	T1,R1/BB	10.09.2018
42	6	Area as a Double Integral(Cartesian Co-Ordinates)	T1,R1/BB	11.09.2018
43	3	Area as a Double Integral(Polar Co-Ordinates)	T1,R1/BB	12.09.2018
44	3	Change of variables in Double Integrals	T1,R1/BB	13.09.2018
45	1	Volume as Double Integrals	T1,R1/BB	14.09.2018
46	1	Triple Integration	T1,R1/BB	15.09.2018
47	2	Volume as a Triple Integral	T1,R1/BB	16.09.2018
48	8	Applications of Multiple Integrals	T1,R1/BB	17.09.2018
<b>UNITV - DIFFERENTIAL EQUATIONS</b>				
49	5	Higher order linear differential equations	T1,R1/BB	18.09.2018
50	1	Higher order linear differential equations based on problems	T1,R1/BB	19.09.2018
51	1	Method of variation of parameters	T1,R1/BB	20.09.2018
52	3	Method of variation of parameters related problems	T1,R1/BB	21.09.2018
53	5	Homogeneous equation of Euler's Type	T1,R1/BB	24.09.2018
54	6	Homogeneous equation of Legendre's Type	T1,R1/BB	25.09.2018
55	1	Homogeneous equation of Legendre's Type Problems	T1,R1/BB	26.09.2018
56	1	System of Linear differential equation	T1,R1/BB	27.09.2018
57	3	Linear differential equation with constant coefficients	T1,R1/BB	28.09.2018
58	3	Differential equations problems	T1,R1/BB	09.10.2018
59	7	Method of undetermined coefficients	T1,R1/BB	10.10.2018
60	8	Method of undetermined coefficients based on problems	T1,R1/BB	11.10.2018

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**Book Reference- Text Book**

S.No	Titleof theBook	Author	Publisher	Year
1.	"Higher Engineering Mathematics"	Grewal, B.S., and Grewal, J.S.,	Khanna Publishers, 43 Edition, New Delhi.	2014
2.	Calculus.	James Stewart	Pearson Education, Asia, 7th Edition.	2015

**Book Reference-References**


S.No	Titleof the Book	Author	Publisher	Year
1.	"Calculus"	Anton	Cengage Learning, New Delhi, 8th Edition.	2016
2.	"Advanced Engineering Mathematics"	Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K	Narosa 3 <sup>rd</sup> Edition	2007



SignatureoftheFacultyin-charge



HoD/S&H



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**DEPARTMENT OF MATHEMATICS**

**Identification of Curricular Gap & Content Beyond Syllabus (CBS)**

Name of the Faculty : Mrs. Poonkodi Course Code & Name: MA8151/Engineering Mathematics  
 Degree & Program: B.Tech/B.E Semester & Section: I/All Academic Year: 2018-2019/ODD

**I. Mapping of Course Outcomes with POs & PSOs. (before CBS)**

**Table.1 Mapping of COs, C, PSOs with POs-before CBS.**

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO2	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO3	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO4	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO5	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO6	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
Cos, POs	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-

**II. Identification of content beyond syllabus.**


**Table.2 Identification of content beyond syllabus**

Detail of Content Beyond Syllabus (CBS) added	POs strengthened/v acant filled	CO/Unit
Real life Applications	PO6(2) Vacant filled	CO1 & CO2/I & II

**III. Mapping of Course Outcomes with POs & PSOs. (After CBS)**

**Table.3 Mapping of COs, C, PSOs with POs-after CBS.**

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO2	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO3	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO4	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO5	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
CO6	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-
Cos, POs	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-

  
 Signature of the Faculty

  
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## DEPARTMENT OF MATHEMATICS

### Assignment Question Paper

Assignment-01			Date of Issue:	20.07.2020	Marks	10
Course code	MA8151	Course Title	Engineering Mathematics			
Year	1	Semester/Section	I/All	Date of Submission:	30.07.2020	

Q.No	Questions	CO
1	Verify the Cayley Hamilton Theorem of the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ . Hence $A^4$ and $A^{-1}$ .	CO1
2	Reduce the quadratic form $3x_1^2 + 3x_2^2 + 3x_3^2 + 2x_1x_2 + 2x_1x_3 - 2x_2x_3$ to canonical form through an orthogonal transformation. Also find its nature, rank, index and signature.	CO1

Name and Signature of the Faculty Incharge

HoD/S & H

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**DEPARTMENT OF SCIENCE AND HUMANITIES**

**Assignment Answer Sheet**

Name of the Student : Benasir S

AU Register Number: 811220104008

Assignment - 1		Date of Issue:	15/9/2020	Marks	10
Course code	MA8151	Course Title	CSE		
Year	2020	Semester/Section	1	Date of Submission:	25/9/2020

Q.No	Questions	CO
1	Verify CHT of the matrix $A = \begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$ hence $A^{-1}$ and $A^{-1}$	
2	Reduce QD form $3x_1^2 + 3x_2^2 - 13x_3^2$ find rank, index and signature	

**Mark Allocation**

Rubrics	Marks Allocated	Marks obtained
Content Quality	6	5
Presentation Quality	2	2
Timely submission	2	1
<b>Total marks</b>	<b>10</b>	<b>8</b>

*S. Danyal*  
 25/09/20  
 Name and Signature of the Faculty Incharge

*(Signature)*  
 Dr. G. Balakrishnan, M.E., Ph.D.,  
 Principal  
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*(Signature)*  
 HoD/S&H



Register Number:



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Internal Assessment		Date/Session	07/10/2020/FN	Marks	100
Course code	MA8151	Course Title	Engineering Mathematics - I		
Regulation	2017	Duration	2 hrs	Academic Year	2020 - 2021
Year	I	Semester	I	Department	All Course

## COURSE OUTCOMES

- CO1: Develop algorithmic solutions to simple computational problems.
- CO2: Develop and execute simple python programs.
- CO3: Write simple python programs using conditionals and loops for solving problems.
- CO4: Decompose a python program into functions.
- CO5: Represent compound data using python lists, tuples, dictionaries etc.
- CO6: Read and write data from to files in python programs.

Q.No.	Question	CO	BTS
<b>PART A</b> (Answer all the Questions 9 x 2 = 18 Marks)			
1	Prove that following integral by interpreting each in terms of areas $\int_a^b x dx = \frac{b^2-a^2}{2}$ .	CO1	1
2	Evaluate $\int \frac{\tan x}{\sec x + \tan x} dx$ .	CO1	1
3	Evaluate $\int \frac{x + \sin x}{1 + \cos x} dx$ .	CO1	1
4	If f is continuous and $\int_0^4 f(x) dx = 10$ , find $\int_0^2 f(2x) dx$ .	CO1	1
5	Evaluate $\int_0^{\infty} \frac{1}{x^2+4} dx$ .	CO1	1
6	Evaluate $\int \sin 4x \cos 5x dx$ .	CO1	1
7	Define Riemann sum.	CO1	1
8	For what values of p in the integral $\int_1^{\infty} \frac{1}{x^p} dx$ convergent?	CO1	1
9	Evaluate $\int \frac{1}{\sqrt{a^2-x^2}} dx$ by using trigonometric substitution.	CO1	1
<b>PART B</b> (Answer all the Questions 3 x 14 = 42 Marks)			
10 a	Using integration by parts, evaluate $\int \frac{(\ln x)^2}{x^2} dx$ .	CO1	1
OR			
10 b	Evaluate $\int_0^{\frac{\pi}{2}} \operatorname{cosec}^3 x dx$ .	CO1	1
11 a	Integrate the following fraction $\int \frac{x^4 - 2x^2 + 4x + 1}{x^3 - x^2 - x + 1} dx$ .	CO1	1
OR			
11 b	Integrate the following with respect to x $\int x\sqrt{1+x-x^2} dx$ .	CO1	1
12 a	Determine whether the integral $\int_1^{\infty} \frac{\log x}{x^2} dx$ is convergent or divergent.	CO1	1
OR			
12 b	i) Integrate the following $\int \frac{10}{(x-1)(x^2+9)} dx$ .	CO1	1
	ii) Evaluate $\int \frac{2x+3}{x^2+x+1} dx$ .		

Course Faculty

(Name / Sign / Date)

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HoD

(Name / Sign / Date)



$$1) \int (x) = \frac{b^2 - a^2}{2}$$

$$2) \int \frac{\tan x}{\sec x + \tan x} = \sec x - \tan x + \pi$$

$$3) \int x \tan x/2 + c$$

$$4) \int_0^2 b(10x) dx = 5$$

$$5) \int_0^1 \frac{1}{x^2+4} dx = \pi/4$$

$$6) \int \frac{1}{2} [\cos x - \frac{1}{9} \cos 9x] + c$$

$$7) \Delta x = \frac{b-a}{n}$$

$$9) \int = \sin^{-1} (x/a) + c$$

$$ii) \int \frac{2x+3}{x^2+x+1} dx = \log(x^2+x+1) + \frac{4}{\sqrt{3}} \tan^{-1} \left[ \frac{2x+1}{\sqrt{3}} \right] + c$$

$$i) \int \frac{10}{(x-1)(x^2+9)} dx = \log(x-1) - \frac{1}{2} \log(x^2+9) - \frac{1}{3} \tan^{-1} \left( \frac{x}{3} \right) + c$$

S. Pongethi

Course Faculty

(Name/Sign/Date)



Dr. G. Balakrishnan, M.E., Ph.D.,

Principal

Indra Ganesan College of Engineering

IG Valley, Madurai Main Road

Manikandam, Trichy-620 012.



HoD

(Name/Sign/Date)



# INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu - 622 012, India  
(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

## Internal Assessment Test Answer Book

Name	Divyadhaeshini . A		Year/ Semester/Section	T - A	
Batch No.	2020 - 2021	Date/Session	12/10/2020	Department	CSE
Course code	MA8151	Course Title	Engineering Mathematics		
Internal Assessment Test	IAT 1 <input type="checkbox"/>	IAT 2 <input type="checkbox"/>	IAT 3 <input type="checkbox"/>	Model <input checked="" type="checkbox"/>	
Name and Signature of the Invigilator with date			Online		

Instruction to the Student: Put tick mark to the question attended in the column against question.

Part A			Part B / Part C			Total Marks
Q. No.	✓	Marks	Q. NO.	✓	Marks	
1		2	10			15
2		2	11			14
3		1	12			14
4		1	13			15
5		0	14			15
6		0	15			73
7		1	Total			73
8		2	Grand-Total			Name and Signature of the Examiner with date
9		1	85/100			
10		2				
Total		12				

To be filled by the examiner							
Course Outcomes	1	2	3	4	5	6	Total
Marks allotted	20	80					100
Marks Obtained	12	73					85
IQAC Audit - Remarks							Name and Signature of the IQAC member

**Dr. G. Balakrishnan, M.E., Ph.D.,**  
 Principal  
 Indra Ganesan College of Engineering  
 IG Valley, Madurai Main Road  
 Manikandam, Trichy-620 012





**INDRAGANESAN COLLEGE OF ENGINEERING**  
**IG VALLEY, MANIDANDAM, TIRUCHIRAPPALLI – 620**  
**012 DEPARTMENT OF MATHEMATICS**

**ACADEMIC YEAR 2020 – 2021 (ODD SEMESTER) Dr. G. Balakrishnan, M.E., Ph.D.,**

**STUDENT MARK STATEMENT-COBASED**

Principal

Indra Ganesan College of Engineering  
IG Valley, Madurai Main Road  
Manikandam, Trichy-620 012.

**AIE-I**

**SUBJECT CODE & TITLE: MA8151 – Engineering Mathematics I**

**YEAR/SEM: I/I**

**MONTH & YEAR: OCT/2020**

S.NO	REGNO	NAME	CO 1	CO 2	TOTAL(50)	TOTAL(100)
1	811220104002	Akshaya T	25	17	42	84
2	811220104004	Appas Ali D	22	16	38	76
3	811220104005	Aravindh V K	28	18	46	92
4	811220104007	Ayisha Siddeequa A	23	12	35	70
5	811220104008	Benasir S	22	17	39	78
6	811220104012	Cibina S	25	12	37	74
7	811220104013	Devi K	19	18	37	74
8	811220104014	Divyadharshini A	24	17	41	82
9	811220104015	Divyakeerthan P	19	18	37	74
10	811220104016	Gayathri P	20	20	40	80
11	811220104017	Gnanaprakasam A	12	12	24	48
12	811220104018	Gowrisankar G	24	14	38	76
13	811220104019	Hariharan K	22	20	42	82
14	811220104021	John P	24	20	44	88
15	811220104024	Kamali A	22	24	46	92
16	811220104025	Kamatchi S	18	17	35	70
17	811220104027	Kiruthika M	AB	AB	AB	AB
18	811220104029	Mathavan N	16	16	32	64
19	811220104031	Monisha R	18	14	32	64
20	811220104032	Priya P	26	14	40	80
21	811220104039	Sathyapriya N	24	18	42	84
22	811220104041	Sivaranjani M	19	19	38	76
23	811220104043	Sneka R	20	24	44	88
24	811220104045	Sridhar P	16	20	36	72
25	811220104046	Sumithira R	18	14	32	64
26	811220104048	Swarnambigai V	AB	AB	AB	AB
27	811220104050	Thirumavalavan K	11	10	21	42
28	811220104051	Vinith Roshan A	13	15	28	56
29	811220104052	Yuvaraj M	16	18	34	68
30	811220104053	Yuva Sri S	18	18	36	72
31	811220104301	Santhosh Kumar S	14	18	32	64
32	811220104302	Irudhayaraj A	24	24	48	96



**MARKSRANGE:**

<20	20-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
0	0	0	1	2	5	14	8	5

<b>TotalNo.ofCandidatesPresent</b>	35
<b>TotalNo.ofCandidatesAbsent</b>	02
<b>TotalNo.ofStudentsPass</b>	34
<b>TotalNo.ofStudentsFail</b>	01
<b>PercentageofPass</b>	97%

  
**STAFFINCHARGE**

  
**HoD/S & H**

  
**PRINCIPAL**

  
**Dr. G. Balakrishnan, M.E., Ph.D.,**  
Principal  
Indra Ganesan College of Engineering  
IG Valley, Madurai Main Road  
Manikandam, Trichy-620 012

Register Number: \_\_\_\_\_



# INDRA GANESAN COLLEGE OF ENGINEERING

**IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India**  
(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

<b>RETEST</b>		<b>Date/Session</b>	<b>10.10.18/AN</b>	<b>Marks</b>	<b>100</b>
<b>Course code</b>	<b>MA8151</b>	<b>Course Title</b>	<b>ENGINEERING MATHEMATICS I</b>		
<b>Regulation</b>	<b>2017</b>	<b>Duration</b>	<b>3 Hrs</b>	<b>Academic Year</b>	<b>2020 – 2021</b>
<b>Year</b>	<b>I</b>	<b>Semester</b>	<b>I</b>	<b>Department</b>	<b>All Branches</b>
<b>COURSE OUTCOMES</b>					
CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems.				
CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.				
CO3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems				
CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.				
CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.				
CO6	Techniques to get a knowledge of Engineering applications				

Q.No.	Question	CO	BTS																									
<b>PART A</b>																												
<b>(Answer all the Questions 10 x 2 = 20 Marks)</b>																												
1	State Level of Significance.	1	K2																									
2	Define Type I and Type II errors.	1	K1																									
3	State assumptions involved in ANOVA	1	K2																									
4	What is meant by LSD?	1	K2																									
5	What is the rate of convergence in NR - method	1	K1																									
6	State the principle used in Gauss Jordan method	2	K2																									
7	State the Lagrange's Interpolation formula	2	K4																									
8	Why Simpson's 1/3 rule is called a closed formula?	2	K2																									
9	What is a Predictor and Corrector method of solving a differential equation?	2	K1																									
10	Write Milne's Predictor formula?	2	K1																									
<b>PART B</b>																												
<b>(Answer all the Questions 5 x 16 = 80 Marks)</b>																												
11a	Analysis data give your conclusion <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>BLOCK</th> <th>Yield</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>I</td> <td>(1) 23</td> <td>a</td> <td>b</td> <td>ab 38</td> </tr> <tr> <td>II</td> <td>b</td> <td>(1) 40</td> <td>a</td> <td>ab 38</td> </tr> <tr> <td>III</td> <td>(1) 29</td> <td>a</td> <td>ab</td> <td>b 20</td> </tr> <tr> <td>IV</td> <td>ab 34</td> <td>a</td> <td>b</td> <td>(1) 28</td> </tr> </tbody> </table>	BLOCK	Yield				I	(1) 23	a	b	ab 38	II	b	(1) 40	a	ab 38	III	(1) 29	a	ab	b 20	IV	ab 34	a	b	(1) 28	1	K1
BLOCK	Yield																											
I	(1) 23	a	b	ab 38																								
II	b	(1) 40	a	ab 38																								
III	(1) 29	a	ab	b 20																								
IV	ab 34	a	b	(1) 28																								
OR																												
11b	Solve the following equations by Gauss – Seidel method $27x + 6y - z = 85, x + y + 54z = 110, 6x + 15y + 2z = 72.$	1	K1																									
12a	Two independent samples of sizes 9 and 7 from a normal population had the following values of the variables <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Samples I</td> <td>18</td> <td>13</td> <td>12</td> <td>15</td> <td>12</td> <td>14</td> <td>16</td> <td>14</td> <td>15</td> </tr> <tr> <td>Samples II</td> <td>16</td> <td>19</td> <td>13</td> <td>16</td> <td>18</td> <td>13</td> <td>15</td> <td></td> <td></td> </tr> </tbody> </table> Do the estimates of the population variance differ significantly at 5 % level ?	Samples I	18	13	12	15	12	14	16	14	15	Samples II	16	19	13	16	18	13	15			2	K1					
Samples I	18	13	12	15	12	14	16	14	15																			
Samples II	16	19	13	16	18	13	15																					

**Dr. G. Balakrishnan, M.E., Ph.D.,**  
 Principal  
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 Manikandam, Trichy-620 012

(ii) If  $f(0) = 1, f(1) = 4, f(3) = 40, f(4) = 85$ . Find  $f(x)$  that satisfies this data using Newton divided difference formula hence find  $f(5)$ .

OR

13a

An insurance agent has claimed that the average age of policy holders who insure through him is less than the average for all agents which is 30.5 years. A random sample of 100 policy holders who had insured through him gave the following age distribution

Age last birthday	16-20	21-25	26-30	31-35	36-40
No. of persons	12	22	20	30	16

Calculate the A.M and S.D of this distribution and use these values to test his claim at the 5% level of significance.

1

K3

OR

13b

Two independent samples from normal population with equal variance gave the following

Sample	Size	Mean	S.D
1	16	23.4	2.5
2	12	24.9	2.8

Is the difference between the means significant?

1

K3

14a

Two random samples drawn from normal populations are

Sample I	20	16	26	27	23	22	18	24	25	19	
Sample II	27	33	42	35	32	34	38	28	41	43	30

Obtain estimates of the variances of the populations and test whether the two populations have the same variance

2

K1

OR

14b

An insurance agent has claimed that the average age of policy holders who insure through him is less than the average for all agents which is 30.5 years. A random sample of 100 policy holders who had insured through him gave the following age distribution

Age last birthday	16-20	21-25	26-30	31-35	36-40
No. of persons	12	22	20	30	16

Calculate the A.M and S.D of this distribution and use these values to test his claim at the 5% level of significance

1

K3

15a

(i) Find a real root of a equation  $\cos x = 3x - 1$  correct to four decimal places using fixed point iteration method.

(ii) Using Jacobi method to find Eigen values and the corresponding Eigen Vectors of the matrix  $\begin{pmatrix} 6 & \sqrt{3} \\ \sqrt{3} & 4 \end{pmatrix}$

1

K1

OR

15b

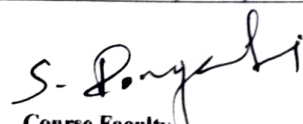
A group of 10 rats fed on diet A and another group of 8 rats fed on diet B, recorded the following increase in weight (gms)

Diet A	5	6	8	1	12	4	3	9	6	10
Diet B	2	3	6	8	10	1	2	8		

Does it show superiority of Diet A and Diet B?

1

K3

  
Course Faculty  
(Name / Sign / Date)

  
Dr. G. Balakrishnan, M.E., Ph.D., (Name / Sign / Date)  
Principal

Indra Ganesan College of Engineering  
IG Valley, Madurai Main Road  
Manikandam, Trichy - 625 013

  
HOD





**INDRA GANESAN COLLEGE OF ENGINEERING**  
**IG VALLEY, MANIDANDAM, TIRUCHIRAPPALLI – 620 012**  
**DEPARTMENT OF MATHEMATICS**  
**ACADEMIC YEAR 2018 – 2019 (ODD SEMESTER)**  
**STUDENTS MARK STATEMENT- CO BASED**

**RETEST**

**SUBJECT CODE & TITLE: MA8151 – ENGINEERING MATHEMATICS I**

**YEAR/SEM: I/I**

**MONTH & YEAR: OCT/2020**

S.NO	REG NO	STUDENT NAME	CO1	CO2	TOTAL (50)	TOTAL (100)
1.	811218205011	MANOHARAN T	25	15	40	80
2.	811218205027	GEETHANJALI R	22	10	32	64

**MARKS RANGE:**

<20	20-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
0	0	0	0	0	1	1	0	0

<b>Total No.of Candidates Present</b>	2
<b>Total No.of Candidates Absent</b>	0
<b>Total No.of Students Pass</b>	2
<b>Total No. of Students Fail</b>	0

**STAFF INCHARGE**

**HoD/S & H**

**PRINCIPAL**

**Dr. G. Balakrishnan, M.E., Ph.D.,**

Principal

Indra Ganesan College of Engineering

IG Valley, Madurai Main Road

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**INDRA GANESAN COLLEGE OF ENGINEERING**  
 IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu - 620 012, India  
 (Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

**DEPARTMENT OF MATHEMATICS**

ROOT CAUSE ANALYSIS

Name of the Faculty : Mrs. Poonkuzhali  
 Degree & Program : B.E / R. Tech  
 IA Test : I/III/Model  
 Target : 100%

Course Code & Name : MA315 - Engineering Mathematics  
 Semester & Section : I / C / 1  
 University Exam/Month & Year : E. 2022  
 Achieved : 50%

S.NO	BATCH NO	NAME OF THE STUDENT	CAUSES FOR FAILURE	CORRECTIVE ACTION TAKEN	PREVENTIVE ACTION TAKEN
1	S 1122	Arinmet	Health Issue	Re-Test	Advised
2	S 1122	Arinmet	Health Issue	Assignment	Advised
3	S 1122	Arinmet	Health Issue	Assignment	Advised
4	S 1122	Arinmet	Health Issue	Assignment	Advised
5	S 1122	Arinmet	Health Issue	Assignment	Advised
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

*S. Poonkuzhali*

Signature of the Faculty Member

Signature of the HoD SAU

Dr. G. Balakrishnan, M.E., Ph.D.,  
 Principal  
 Indra Ganesan College of Engineering  
 IG Valley, Madurai Main Road  
 Manikandam, Trichy-620 012.



**INDRA GANESAN COLLEGE OF ENGINEERING**  
 IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu - 620 012, India  
 (Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

**IQAC Academic Audit Form**

ACADEMIC YEAR: 2020-2022 ODD / EVEN SEMESTER

Name of Department: \_\_\_\_\_ Year / Sem / Sec : \_\_\_\_\_  
 Details of Examination: \_\_\_\_\_  
 Total of students Registered: \_\_\_\_\_

S.No.	Course Code	List of Reg.No Verified	Course Log Book Verified (Y/N)	Course File Verified (Y/N)	No. of students Attended	No. of Absentees	No. of Failures	Pass %	Remarks
1	MAS101	CS	Y	Y	36	1	0	89%	
2	MAS101	CS	Y	Y	41	1	2	88%	
3	MAS101	EED	Y	Y	36	2	5	81%	
4	MAS101	MIFCH	Y	Y	36	-	7	79%	
5	MAS101	ECE	Y	Y	46	5	13	72%	
6	MAS101	Agri	Y	Y	38	-	9	76%	

Verified by \_\_\_\_\_

External Member Name and Signature: \_\_\_\_\_

Internal Member Name and Signature: *S. Pongath*

Overall Remarks: \_\_\_\_\_

*[Signature]*

HOD/ H&S

IQAC Co-ordinator

Principal

*[Signature]*

**Dr. G. Balakrishnan, M.E., Ph.D.,**  
 Principal  
 Indra Ganesan College of Engineering  
 IG Valley, Madurai Main Road  
 Manikandam, Trichy-620 012