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Table of Contents

Note : Remove “Table of Content” before including in CP Book
Each Course Plan shall be printed and made into a book with cover page
Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

18MAT31 : Engineering Mathematics-III

A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	IS\CS\EEE
Year / Semester :	II / III	Academic Year:	2018-19
Course Title:	Engineering mathematics	Course Code:	18MAT31
Credit / L-T-P:	4/4-0-0	SEE Duration:	180 Minutes
Total Contact Hours:	50	SEE Marks:	80 Marks
CIA Marks:	20	Assignment	3
Course Plan Author:	G Pujitha	Sign	Dt:03-08-2018
Checked By:	Veerabhadraswamy V C	Sign	Dt:

2. Course Content

Module	Module Content	Teaching Hours	Module Concepts	Blooms Level
1	Fourier series of 2Π,2l period & half range fourier series, Harmonic analysis.	10	Analyze circuits&system communication	L4
2	Fourier transforms & Fourier inverse transforms	5	Continous signal process	L3
2	Z-transforms and inverse z-transforms	5	Discreate signal process	L3
3	Statistical methods, curve fitting, lines of regression, correlation.	7	Data analyzing	L3
3	Regular falsie& newton Raphson	3	Solution of transcendental equation	L3
4	Newton forward & backward divided difference&lagranges	5	interpolation&extrapolation	L3
4	Simpson 1/3 &3/8 &weddles rule	5	Definite integrals	L3
5	Line integrals, Green's, StokeS & Gauss divergent theorem and problems	7	Electro magnetic and fluildflow	L4
5	Variational problems, euler's equations,geodesics and problems	3	Maximum and minimum	L4

3. Course Material

Module	Details	Available
1	Text books	
	1;.B.S Grewal, higher engineering mathematics	In Lib/dept
	2:Advanced engineering mathematics by ERWIN KREYZIG 3:Advanced engineering mathematics by PETER V. O'NEIL	In Lib/dept
2	Reference books	
	1: N.P.BAIL AND MANISH GOYAL:A text book of engineering mathematics,laxmi publishers,7th edition,2010	In dept
	B.V Ramana:Higher engineering mathematics TATA McGRAW-HILL 2006	In Lib
3	Others (Web, Video, Simulation, Notes etc.)	
	VTU EDUSAT PROGRAMME	Available

4. Course Prerequisites

SNo	Course Code	Course Name	Module / Topic / Description	Sem	Remarks	Blooms Level
1	17MAT21	Engeering maths-2	Module-4/ Evaluate double & triple integral	2	Revision	L4

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

B. OBE PARAMETERS

1. Course Outcomes

#	COs	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
CO1	Analyze expansion of Fourier series using Euler formula	10	Analyze circuits&system communication	Lecture	Assignment and Slip Test	L4
CO2	Apply to transform form one to another domain by Fourier integrals	5	Continuous signal process	Lecture	Assignment and Slip Test	L3
CO3	Apply to transform one domain to another domain by z-transforms	5	Discrete signal process	Lecture	Assignment and Slip Test	L3
CO4	Apply to construct numerical data and solving by least square method	7	Data analyzing	Lecture	Assignment and Slip Test	L3
CO5	Apply to solve transcendental equations by appropriate numerical method	3	Solution of transcendental equation	Lecture	Assignment and Slip Test	L3
CO6	Apply to construct the relevant table which are present in the formula by using appropriate method	5	Interpolation &Extrapolation	Lecture	Assignment and Slip Test	L3
CO7	Apply to evaluate definite integral from a set of table values by Simpson's &Weddell's rule	5	Definite integrals	Lecture	Assignment and Slip Test	L3
CO8	Analyze the evaluation of double, triple and vector product by green's,stokes gauss divergence theorem	7	Electro magnetic & fuildflow	Lecture	Assignment and Slip Test	L4
CO9	Analyze how to apply the Euler's equations for a given function by Euler's equation	3	maximum& minimum	Lecture	Assignment and Slip Test	L4
-		**50**	-	-	-	-

Note: Identify a max of 2 Concepts per Module. Write 1 CO per concept.

2. Course Applications

SNo	Application Area	CO	Level
1	To study the nature of wave forms in voltage- current characteristics .	CO1	L3
2	To study the continuous and Apply to transform one domain to another domain by z-transforms discrete signals and its properties.	CO2	L3

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3	Used to convert to discrete time domain signal into discrete frequency domain signal.	CO3	L3
4	Curve fitting is the process of constructing a curve that has the best fit to a series of data points.	Co4	L3
5	Is method used for finding simple zeros of non-linear equations.	CO5	L3
6	Is used for the analysis of a rectangular thin plate.	CO6	L3
7	Method is used for finding numerical approximation for definite integrals.	CO7	L3
8	To find the rate of change of the mass of a fluid flow	CO8	L4
9	one way of finding approximations to the lowest energy eigenstate or ground state, and some excited states;	CO9	L4

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO – PO MAPPING)

-	Course Outcomes	Program Outcomes												
#	COs	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	Level
CO1	Analyze expansion of Fourier series using Euler formula	√	√	√						√		√	√	L4
CO2	Apply to transform form one to another domain by Fourier integrals	√	√	√						√		√	√	L3
CO3	Apply to transform one domain to another domain by z-transforms	√	√	√						√		√	√	L3
CO4	Apply to construct numerical data and solving by least square method	√	√	√						√		√	√	L3
CO5	Apply to solve transcendental equations by appropriate numerical method	√	√	√						√		√	√	L3
CO6	Apply to construct the relevant table which are present in the formula by using appropriate method	√	√	√						√		√	√	L3
CO7	Apply to evaluate definite integral from a set of table values by Simpson's &Weddell's rule	√	√	√						√		√	√	L3
CO8	Analyze the evaluation of double, triple and vector product by green's,stokes gauss divergence theorem	√	√	√						√		√	√	L4
CO9	Analyze how to apply the Euler's equations for a given function by Euler's equation	√	√	√						√		√	√	L4
	Average													
Note: Mention the mapping strength as 1, 2, or 3														

4. Mapping Justification

Mapping		Justification	Mapping Level
CO	**PO**	**-**	**-**
CO1	PO1	Apply the knowledge of Fourier series to find the solution to complex engineering problems.	L3
CO1	PO2	To analyze boundary value problems for linear ODE's	
CO2	PO1	Apply the knowledge of Fourier transforms to find solution to complex engineering problems.	L3
CO2	PO2	To analze time domain and frequency domain in signal processing.	
CO3	PO1	Apply the knowledge of Z-Transforms to find the solution to complex engineering problems.	L3
CO3	PO2	To Analyze digital filters and discrete signal.	
CO4	PO1	Apply the knowledge of interpolation in solving complex engineering problems.	L3
CO4	PO2	Apply power flow analysis of electrical power system using N-R method.	
CO5	PO1	Apply the knowledge of interpolation in solving complex engineering problems.	L3
CO5	PO2	Used to analyze different model in computer aided engineering	
CO6	PO1	Apply the knowledge of integration in solving complex engineering problems.	L3
CO6	PO2	To analyze static dynamic reaction forces on areas and volumes of solids.	
CO7	PO1	Apply the knowledge of line integral n solving complex engineering problems.	L3
CO7	PO2	To analyze and measure the energy level in water turbines and cyclones	
CO8	PO1	Apply the knowledge of calculus in solving complex engineering problems.	L3
CO8	PO2	To analyze the rotation of a rigid body using a reference frame with its axis fixed to the body.	

Note: Write justification for each CO-PO mapping.

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

Note: Write Gap topics from A.4 and add others also.

6. Content Beyond Syllabus

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					
6					
7					

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8					
9					
10					

Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

Module #	Title	Teaching Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Fourier series	10	2	-	-			2	CO1,	L4
2	Fourier Transforms and Z-TRANSFORMS	10	2	-	-			2	CO2, CO3	L3
3	Statistical methods , curve fitting and numerical methods.	10	-	2	-			2	CO4, CO5	L3,
4	Finite difference and numerical integration	10	-	2	-			2	CO6, C07	L3
5	Vector integration and Calculus of variations	10	-	-	4			2	CO8, CO9	L4
-	**Total**	**50**							**-**	**-**

Note: Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

2. Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	30	CO1, CO2, CO3, CO4	,L3,L4
CIA Exam – 2	30	CO4 ,CO5, CO6, CO7,	L3
CIA Exam – 3	30	C08,CO9,	L4
Assignment - 1	10	CO1, CO2, CO3, CO4	,L3,L4
Assignment - 2	10	CO4 ,CO5, CO6, CO7,	L3
Assignment - 3	10	C08,CO9,	L4
Seminar - 1	-	-	-
Seminar - 2	-	-	-
Seminar - 3	-	-	-
	-	-	-
Other Activities – define – Slip test	-	-	-
Final CIA Marks	**40**	**-**	**-**

Note : Blooms Level in last column shall match with A.2 above.

D1. TEACHING PLAN - 1

Module - 1

Title:	Fourier series	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Analyze expansion of fourier series using eulers formula	CO1	L4

b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	Periodic functions, Dirichlet's conditions	CO1	L4
2	Fourier series of periodic functions of period 360	co1	
3	Fourier series of periodic functions of arbitrary period 2c	CO1	
4	Fourier series of even and odd functions	CO1	
5	Solving numericals	CO1	
6	half range cosine Fourier series	CO1	
7	half range sine Fourier series	CO1	
8	Practical harmonic analysis	CO1	
9	Solving numericals	CO1	
10	Complex fourier series	CO1	
c	**Application Areas**	**CO**	**Level**
1	To study the nature of wave forms in voltage- current characteristics .	CO1	L4
d	**Review Questions**	-	-
1	Obtain the Fourier series for the function f(x) $\begin{cases} \pi x : 0 \le x \le 1 \\ \pi(2-x) : 1 \le x \le 2 \end{cases}$ and deduce that $\frac{\pi^2}{8} = \sum_{n=1}^{\infty} \frac{1}{(n-1)^2}$.	CO1	L1
2	1. compute the constant term and the first two harmonics in the Fourier series of f(x) given by the following table X : 0 1 2 3 4 5 f(x) : 4 8 15 7 6 2	CO1	L3
3	If f(x) = $\lvert cosx \rvert$ expand f(x) as a Fourier series in the interval (-π , π)	CO2	L2
4	Expand the function f(x) =xsinx as a Fourier series series in the interval –π ≤ x ≤ π	CO2	L4
5	Obtain the Fourier series of f(x)= $\frac{\pi - x}{2}$ 0<x<2π and Hence deduce that $\frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} \cdots\cdots\cdots = \frac{\pi}{4}$.		
6	Expand the function f(x) defined by f(x) $\begin{cases} \frac{1}{4} - x : 0 < x < \frac{1}{2} \\ x - \frac{3}{4} : \frac{1}{2} < x < 1 \end{cases}$ in a half range sine series	CO2	L5
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

Module – 2

Title:	Fourier transform and z-transforms	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**

-	The student should be able to:	-	**Level**
1	Apply to transform form one to another domain by fourier intergrals	CO3	L3
2	Apply to transform one domain to another domain by z-transforms	CO4	L3
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
17	Infinite fourier transform	CO2	L3
18	Fourier sine transform	CO2	L3
19	Fourier cosine transform	CO2	L3
20	Basic definition, Z-transforms definition	CO3	L3
21	Standard Z-transforms, damping rule	CO3	L3
22	Shifiting rule, initial value and final value theorems	CO3	L3
23	Solving numerical	CO3	L3
24	Inverse Z-transform	CO3	L3
25	Numericals	CO3	L3
26	Applications to solve difference equations	CO3	L3
c		**CO**	**Level**
1	To study the continuous and Apply to transform one domain to another domain by z-transforms discrete signals and its properties.	CO2	L3
2	Used to convert to discrete time domain signal into discrete frequency domain signal.	CO3	L3
d	**Review Questions**	-	-
12	Find the Fourier sine and cosine transforms of f(x)=$e^{-\alpha x}$, where $\alpha>0$.	CO3	L3
13	Find the Fourier sine and cosine transforms of f(x)=$x\,e^{-ax}$, where a>0	CO4	L3
14	Find the inverse Fourier transform of e^{-u^2}.	CO2	L3
15	find the Fourier cosine transform of f(x) =$\frac{1}{1+x^2}$.	CO2	L3
16	Find the inverse Fourier sine transform of $\frac{1}{s}e^{-as}$.	CO2	L3
17	Find the inverse Z-transforms of $\frac{Z}{(Z-1)(Z-2)}$.	CO3	L3
18	Solve the difference equation $Y_{n+2}+2Y_{n+1}+Y_n=n$ with $Y_0=Y_1=0$ using Z transforms.	CO3	L3
19	Solve the difference equation $y_{n+2}+6y_{n+1}+9y_n=2^n$ with $y_0=y_1=0$ using Z transforms.	CO3	L3
e	**Experiences**	-	-
1		CO1	L2
2			

3			
4		CO3	L3
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	18MAT31	Sem:	III	Marks:	30	Time:	75 minutes
Course:	Engineering maths-3						

-	-	**Note: Answer any 3 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	*Obtain the Fourier series for* $f(x)=\pi-\lvert x\rvert$ *in the interval* $(-\pi,\pi)$	5	CO-1	L4
	b	*find the Sine half range Fourier series of* $f(x)$ *If* $f(x)=\begin{cases}-k & if\ -2<x<0\\ k & if\ 0<x<2\end{cases}$	5	CO-1	L4
	c	*Obtain the Fourier series for y upto first harmonic*	5	CO1	L4
		OR			
2	a	Find the Fourier sine and cosine transforms of f(x)=$e^{-\alpha x}$, where α>0.	5	CO2	L3
	b	Find the Fourier sine and cosine transforms of f(x)=$x\,e^{-ax}$, where a>0	5	CO2	L3
	c	Find the inverse Fourier transform of e^{-u^2}.	5	CO2	L3
		MODULE-2(15 marks)			
3	a	*Expand the function f(x)= xCOSX Fourier series in the interval* $0\le x\le 2\pi$ $0\le x\le\pi$	5	CO1	L4
	b	*Solve the difference equation* $Y_{n+2}+2Y_{n+1}+Y_n=n$ *with* $Y_0=Y_1=0$ *using Z transforms.*	5	CO3	L3
	c	*Find the Fourier series for f(x)=* $-\pi$ *for* $-\pi<x<0$, $\wedge f(x)=x$ *for* $0<x<\pi$ *Deduce that* $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\cdots\infty=\frac{\pi^2}{8}$	5	CO1	L4
		OR			
4	a	*Find the half range cosine series for the function f(x)=* $(x-1)^2$ *in 0 < x < 1.*	5	CO1	L4
	b	*Find* a_0, a_1, a_2 *in the half range Fourier cosine series of y using the following table*	5	CO1	L4

x	0	1	2	3	4	5

			y	8	6	4	7	9	11				
	c	Expand the function f(x)= xsinx as a Fourier series in the interval $0 \le x \le 2\pi$								5	CO1	L4
		$0 \le x \le \pi$										

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	18MAT31	Sem:	III	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Engg.Maths-3						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1		Obtain the half range Fourier sine series for the function f(x) $\begin{cases} \frac{1}{4} - x : 0 < x < \frac{1}{2} \\ x - \frac{3}{4} : \frac{1}{2} < x < 1 \end{cases}$	5	CO1	L4
2		Compute the constant term and the first two harmonics in the Fourier series of f(x) given by the following table X : 0 1 2 3 4 5 f(x) : 4 8 15 7 6 2	5	CO1	L4
3		Find the Fourier series for the function f(x)=x(2π-x) over the interval (0 , 2π) and hence deduce that $\frac{\pi^2}{12} = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2}$		CO1	L4
4		Expand the function f(x) =x– x^2 in the interval –π < x < π . Deduce that $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \ldots\ldots\ldots$	5	CO1	L4
5		Find the half range cosine series for the function f(x)= $(x-1)^2$ in 0 < x < 1.		CO1	L4
6		Obtain the half range cosine series for the function f(x)=sinx in $0 \le x \le \pi$		CO1	L4
7		Obtain the Fourier series of f(x)= $\frac{\pi - x}{2}$ 0<x<2π and Hence deduce that $\frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} \ldots\ldots\ldots = \frac{\pi}{4}$.		CO1	L4
8		Find the Fourier cosine transform of f(x)=e^{-ax} , a≥0 , hence find $\int_0^{\infty} \frac{\cos\alpha x}{a^2+\alpha^2}$ dx.		CO2	L3
9		Find the Fourier transform of f(x)=$e^{-a\|x\|}$, where a>0.		CO2	L3
10		Find the inverse Fourier transform of $\frac{s}{1+s^2}$.		CO2	L3
11		Find the Fourier sine and cosine transforms of f(x) $\begin{cases} x, 0 < x < 2 \\ 0, elsewhere \end{cases}$		CO2	L3
12		Find the Z-transforms of i) $(2n-1)^2$ ii) $\cos(\frac{n\pi}{2} + \frac{\pi}{4})$		CO3	L3

13	Find the Z-transforms of i) $(n+1)^2$ ii) 5m(3n+5)		CO3	L3
14	Find the response of the system y_{n+2}-5y_{n+1} +6 y_n=u with y_0=0 , y_1=1 and $u_n=1$ for n=0,1,2,3,.....by Z transform method .		CO3	L3
15	Find the Z-transforms of i) $(n+1)^2$ ii) cosh$n\theta$		CO3	L3
16	Find the inverse Z-transforms of $\frac{Z}{(Z-1)(Z-2)}$.		CO3	L3
17	Prove that i) Z(cosnθ)= $\frac{Z(Z-cos\theta)}{Z^2-2Zcos\theta+1}$; ii) Z($sinn\theta$) = $\frac{Z\,sin\theta}{Z^2-2Zcos\theta+1}$		CO3	L3
18	Find the Z-transforms of i) n^2 ii) ne^{-an} .		CO3	L3
19	Solve *the difference equation* u_{n+2}-5u_{n+1} +6 u_n=2 with u_0=3 , u_1=7 using Z transforms.		CO2	L3
20	Obtain the inverse Z-transforms of $\frac{3Z^2+2Z}{(5Z-1)(5Z+2)}$		CO3	L3
21	Find Z(e^{-an} $sinn\theta$) and Z(ncosnθ).		CO2	L3
22	Solve the difference equation y_{n+2}+6y_{n+1} +9y_n=2n with y_0=y_1=0 using Z transforms.		CO2	L3
23	Solve u_{n+2}+2u_{n+1} +u_n=n with u_0=u_1=0		CO2	L3
24	Obtain the inverse Z-transforms of $\frac{4Z^2-2Z}{Z^3-5Z^2+8Z-4}$		CO2	L3

D2. TEACHING PLAN - 2

Module – 3

Title:	Statical methods, curve fitting and numerical methods	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Bloo ms**
-	The student should be able to:	-	**Level**
1	Apply to construct numerical data and solving by least square method	CO4	L3
2	Apply to solve transcendental equations by appropriate numerical method	CO5	L3
b	***Course Schedule***		
Clas s No	**Module Content Covered**	**CO**	**Level**
1	Correlation and rank correlation coefficient	CO4	L3
2	Regression and Regression coefficients	CO4	L3
3	lines of regression - problems	CO4	L3
4	Fitting of curves introduction- Fitting equation of straight line.	CO4	L3
5	Fitting equation of parabola.	CO4	L3
6	Fitting equation of exponential curve.	CO4	L3
7	Solving numericals	CO4	L3
8	Regula-falsi method	CO5	L3
9	Secant method	CO5	L3
10	Newton - Raphson method	CO5	L3
c	**Application Areas**	**CO**	**Level**
1	Curve fitting is the process of constructing a curve that has the best fit to a series of data points.	Co4	L3

2	Is method used for finding simple zeros of non-linear equations.	CO5	L3
d	**Review Questions**	-	-
1	Fit a curve of the form $y=ae^{bx}$ to the following data : x : 77 100 185 239 285 y : 2.4 3.4 7.0 11.1 19.6	Co4	L3
2	2. Fit a parabola by using least squares method to the following method to the following data : x : 1.0 1.5 2.0 2.5 3.0 3.5 4.0 y : 1.1 1.3 1.6 2.0 2.7 3.4 4.1	Co4	L3
3	Using the Regula-falsi method , find the root of the equation $xe^x = cosx$ that lies between 0.4 and 0.6 . carry out 4 iterations .	CO5	L3
4	Show that the real root of the equation tanx+tanhx =0 lies between 2 and 3. Then apply the Regula-falsi metod to find the third approximation .	CO5	L3
5	using Regula-falsi method calculate the real root of the following equationcorrect to five decimal places $x\log_{10}x=1.2$	CO5	L3
6	Using the Newton-Raphson method, find the real root of the equation 3x=cosx+1.	CO5	L3
7	Find the third approximate root of $xe^x-2=0$, by Regula-falsi method	CO5	L3
8	Using the Newton-Raphson method, find the real root of $x\log_{10}x=1.2$ correct to five decimal places.	CO5	L3
e	**Experiences**	-	-
1			
2			
3			
4			
5			

Module – 4

Title:	Finite difference method and Numerical Integration	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Apply to construct the relevant table which are present in the formula by using appropriate method	CO6	L3
2	Apply to evaluate definite integral from a set of table values by Simpson's &Weddell's rule	CO7	L3

b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Newton"s forward and backward interpolation formulae	CO6	L3
2	Solving numericals	CO6	L3
3	Newton"s divided difference formula	CO6	L3
4	Solving numericals	CO7	L3
5	Lagrange"s interpolation formula and inverse interpolation formula	CO7	L3
6	Simpson"s 1/3 rule	CO7	L3
7	Simpson"s 3/8 rule	CO7	L3
8	Weddle's rule	CO7	L3
9	Solving numericals	CO7	L3
10	Solving numericals	CO7	L3
c	**Application Areas**	**CO**	**Level**
1	Is used for the analysis of a rectangular thin plate.	CO6	L3
2	Method is used for finding numerical approximation for definite integrals.	CO7	L3
d	**Review Questions**	-	-
1	From the following table estimate the number of students who have obtained the marks between 40 and 45 : Marks : 30-40 40-50 50-60 60-70 70-80 Number of students : 31 42 51 35 31	CO6	L3
2	Using Lagrange's formula , find the interpolating polynomial that approximate the function described by the following table and hence find f(1) and f(4) . X : -1 0 2 3 f(x) : -8 3 1 2	CO6	L3
3	A curve is drawn to pass through the points given by the following table : X : 1 1.5 2 2.5 3 3.5 4 Y : 2 2.4 2.7 2.8 3 2.6 2.1 Using weddle's rule , estimate the area bounded by the curve the x-axis and the lines x=1 , x=4 .	CO6	L3
4	Using Lagrange's formula , find the interpolating polynomial that approximate the function described by the following table X : 0 1 2 5 f(x) : 2 3 12 147	CO6	L3
5	Evaluate values $y=\log_e x$, $4\le x\le 5.2$, in steps of 0.2 and find $\int_4^{5.2} \log_e x \, dx$ using simpon's $\frac{3}{8}$ rule .	CO7	L3
6	Evaluate $\int_0^1 \frac{x}{1+x^2} dx$ using weddle's rule taking 7 ordinates and hence find $\log_e 2$.	CO7	L3
e	**Experiences**	-	-
1			
2			
3			

4			
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	18MAT31	Sem:	III	Marks:	30	Time:	75 minutes
Course:	Engineering.Maths-3						

-	-	**Note: Answer any 2 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	**By using N-R method find a root of the equation $x\log x_{10}=1.2$.lies near x=2.5**	20	CO5	L3
	b	**Fit a curve of the form $y=ax+b$ for the data and hence find y when x=8** x: 1, 2, 3, 4, 5, 6, 7 y: 87, 97, 113, 129, 202, 195, 193		CO4	L3
	c	The equation of Regressions lines of 2 variables x and y are **y = 0.516x +33.73, x = 0.512y+32.52. Find the correlation coefficient and $\bar{x}$ and $\bar{y}$**		CO4	L3
		OR			
2	a	Find the coefficient of correlation and Regression lines for the following data x: 1, 2, 3, 4, 5, 6, 7, 8, 9 y: 10, 12, 16, 28, 25, 36, 41, 49, 40		co4	L3
	b	**Fit a parabola of the form $v=at^2+bt+c$ for the data** t: 1, 2, 3, 4, 5, 6, 7 v: 2.31, 2.01, 3.8, 1.66, 1.55, 1.47, 1.41	20	CO4	L3
	c	**Find the root of the equation $x^3-4x+9=0$ from False –Position method**		CO5	L3
		MODULE-4(15 marks)			
3	a	Fit the straight line for following data x(years): 1961, 1971, 1981, 1991 y(productions): 8, 10, 12, 10 Also find expected production in the year 2001		CO4	L3
	b	**Use Simpson s one third rule to find $\int_0^2 e^{-x^2}dx$ by taken 4 equal parts**		CO7	L3
	c	**Pressure and volume of the gas are related by the equation $pv^{\gamma}=k,\gamma$ and k being constants , fit this equation** P: 0.5, 1, 1.5, 2, 2.5, 3 v: 1.62, 1, 0.75, 0.62, 0.52, 0.46	20	CO4	L3
		OR			
4	a	Find f(0.1) and f(4.99) by using suitable interpolation formula from the data x: 0, 1, 2, 3, 4, 5 y: -8, 0, 20, 58, 120, 212		CO6	L3
	b	**Evaluate $\int_4^{5.2}\log_e x dx$ using weddle s rule taking 7 ordinates**		CO7	L3
	c	**The following tables gives marks got by 100 students in 3rd sem**		CO6	L3

Mathematics . How many students got more than 45 marks.

x	30-40	40-50	50-60	60-70	70-80
y	25	35	22	7	11

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions

Crs Code:	18MAT31	Sem: III	I	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Engineering mathematics-III						

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1		Using Lagrange's formula , find the interpolating polynomial that approximate the function described by the following table : X : 0 1 2 f(x) : 3 6 11 Hence find f(0.5) and f(3.1).	5	CO6	L3
2		Evaluate $\int_4^{5.2} \log_e x \, dx$ using weddle's rule taking 7 ordinates.	5	CO9	L3
3		Using Newton's divided difference formula , find f(9) given : X : 5 7 11 f(x) : 150 392 1452		CO10	L3
4		The area of a circle (A) corresponding to diameter (D) is given below : D : 80 85 90 A : 5026 5674 6362 Find the area corresponding to diameter 105 using an appropriate interpolation formula.	5	CO6	L3
5		A rod is rotating in a plane . The following table gives the angle θ (in radians) through which the rod has turned for various values of 't' (in seconds) t 0 0.2 0.4 0.6 θ 0 0.12 0.49 1.12 Calculate the angular velocity and angular acceleration of the rod at t=0.4 second .		co6	L3
6		using simpon's $(\frac{3}{8})^{th}$ rule, Evaluate $\int_0^{0.3} \sqrt{1-8x^3}\,dx$ by taking 7 ordinates.		CO7	L3
7		Using Newton's divided difference formula , find f(4) given : X : 0 2 3 f(x) : -4 2 14		CO6	L3

8	Evaluate $\int_0^1 \frac{x}{1+x^2}dx$ by using simpon's $(\frac{3}{8})^{th}$ rule, dividing the interval into 3 equal parts. Hence find an approximate value of $\log_e \sqrt{2}$.		CO7	L3
9	Under the suitable assumptions find the missing terms in the following table : X: -0.2, 0.0, 0.2, 0.4 F(x): 2.6, _, 3.4, 4.28		CO6	L3
10	By dividing the range into 6 equal parts , find the approximate value of $\int_0^{\pi} e^{sinx}dx$ using simpon's $(\frac{1}{3})^{rd}$ rule.		CO7	L3
11	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using simpon's $(\frac{3}{8})^{th}$ rule, taking 7 ordinates.Hence find the approximate value of π.		CO7	L3
12	Construct an interpolating polynomial for the data given below Using newton's divided formula: x: 2, 4, 5, 6 y: 10, 96, 196, 350		CO6	L3
13	The population of a town is given by the table : year: 1951, 1961, 1971 Population in thousand: 19.96, 39.65, 58.81 Using newton's forward and backword formula , calculate the increase in population from the year 1955 to 1985.		CO6	L3
14	Given : x: 0, 1, 2, 3 y: 0, 2, 2.5, 2.3 Evaluate $\int_0^6 y\,dx$ using weddle's rule.		CO6	L3
15	Given X : 0, 2 F(x) : -4, 2 Find y(4) by Newton's divided difference formula .		CO6	L3
16	Evaluate $\int_{0.2}^{1.4} (sinx - logx + e^x)dx$ using weddle's rule taking 7 ordinates.		CO7	L3
17	Use Simpson's $(\frac{3}{8})^{th}$ rule to obtain the approximate value of the integral		CO7	L3

		$\int_{0}^{0.3} \frac{1-8x}{(\|3)^{\frac{1}{2}}}$ dx by considering 3 equal intervals ❑			
18		Evaluate $\int_{0}^{1} \frac{dx}{1+x}$ by using simpon's $(\frac{3}{8})^{th}$ rule, taking 7 ordinates.Hence find the value of $\log_e 2$.		CO7	L3

D3. TEACHING PLAN - 3

Module – 5

Title:	Vector integration and calculus of vartion	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Analyze the evaluation of double&triple,&vector product by green's,stokes gauss divergence theorem	CO8	L4
2	Analyze how to apply the Euler's equations for a given function by Euler's equation	CO9	L4
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Line integrals - definition and problems	CO8	L4
2	surface and volume Integrals definition, Green"s theorem in a plane	CO8	L4
3	Stoke's theorem	CO8	L4
4	Gauss divergence theorem	CO8	L4
5	Solving numericals	CO8	L4
6	Variation of function and Functional	CO9	L4
7	Variational problems, Euler"s equation	CO9	L4
8	Geodesic	CO9	L4
9	Minimal surface of revolution	CO9	L4
10	Hanging chain	CO9	L4
c	**Application Areas**	**CO**	**Level**
1	To find the rate of change of the mass of a fluid flow	CO8	L4
2	one way of finding approximations to the lowest energy eigenstate or ground state, and some excited states;	CO9	L4
d	**Review Questions**	-	-
1	Using Green s Theorem evaluate $\oint_c (y-\sin x¿)\,dx+\cos x\,dy$ ¿ where c is the plane triangle enclosed by the lines $y=0, x=\pi/2, y=\frac{2x}{\pi}$	CO8	L4
2	Verify Stoke s theorem for $F=(2x-y)i-(yz^2)j-y^2zk$over the surface of $x^2+y^2+z^2=1$bounded by its projection on the xy-plane	CO8	L4
3	Solve the Variation problem $\delta\int_{❑}^{❑} x^2y^{2\cdot}+2y(x+y)dx=0$Given y(1)= y(2)=0	CO9	L4
4	If $\vec{f}=3xyi-yj+2xzk$evaluate $\int f.dr$ where C is the curve	CO9	L4

	represented by x=t, $y=t^2$, $z=t^3$ -1< t <1		
5	State and prove Euler's equation.	CO9	L4
6	Prove that shortest distance between two points in a plane is a straight line.	CO9	L4
e	**Experiences**	-	-
1		CO10	L2
2			
3			
4		CO9	L3
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	CS501PC	Sem:	I	Marks:	30	Time:	75 minutes		
Course:	Design and Analysis of Algorithms								
-	**-**	**Note: Answer any 2 questions, each carry equal marks.**					**Marks**	**CO**	**Level**
1	a	Using Green s Theorem evaluate $\oint_c (y-\sin x¿)\,dx+\cos x\,dy¿$ where c is the plane triangle enclosed by the lines $y=0, x=\pi/2, y=\frac{2x}{\pi}$					5	CO-8	L-4
	b	Verify Stoke s theorem for $F=(2x-y)i-(yz^2)j-y^2zk$over the surface of $x^2+y^2+z^2=1$bounded by its projection on the xy-plane					5	CO-8	L-4
	c	Solve the Variation problem $\delta\int_{\square}^{\square} x^2y^{2_1}+2y(x+y)dx=0$Given y(1)= y(2)=0					5	CO-9	L-4
2	a	Verify stokes theorem F= yi+zj+xk where S is upper half of the sphere $x^2+y^2+z^2=1$					7	CO10	L2
	b	Evaluate $\iint f.nds$ given f = xi +yj+zk over the sphere $x^2+y^2+z^2=a^2$					8		L3
3	a	If $\vec{f}=3xyi-yj+2xzk$evaluate $\int f.dr$ where C is the curve represented by x=t, $y=t^2$, $z=t^3$ -1< t <1					5	CO8	L4
	b	State and prove Euler's equation.					5	CO9	L4
	c	Prove that shortest distance between two points in a plane is a straight line.					5	CO9	L4
4	a	Verify gauss theorems F= yi+zj+xk where S is upper half of the sphere $x^2+y^2+z^2=1$					7	CO8	L4
	b	Find the plane curve of length I having the points (x1,y1) and (x2,y2) such that area under the curve between x= x1 and x=x2 is maximum					8	CO9	L4

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	18MAT31	Sem:	III	Marks: 5	5 / 10	Time:	90 – 120 minutes
Course:	Engg.Maths-III						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level

BS

Prepared by Checked by Approved

1		Using Green s Theorem evaluate $\oint_c (y-\sin x¿)\,dx+\cos x\,dy¿$ where c is the plane triangle enclosed by the lines $y=0, x=\pi/2, y=\frac{2x}{\pi}$	5	CO8	L4
2		Verify Stoke s theorem for $F=(2x-y)i-(yz^2)j-y^2zk$over the surface of $x^2+y^2+z^2=1$bounded by its projection on the xy-plane	5	CO8	L4
3		Solve the Variation problem $\delta\int x^2 y^{2_1}+2y(x+y)dx=0$Given y(1)= y(2)=0		CO9	L4
4		If $\vec{f}=3xyi-yj+2xzk$evaluate $\int f.dr$ where C is the curve represented by x=t, $y=t^2$, $z=t^3$ -1< t <1	5	CO9	L4
5		State and prove Euler's equation.		CO9	L4
6		Prove that shortest distance between two points in a plane is a straightline.		CO9	
7		Verify gauss theorems F= yi+zj+xk where S is upper half of the sphere $x^2+y^2+z^2=1$		CO8	L4
8		Find the plane curve of length I having the points (x1,y1) and (x2,y2) such that area under the curve between x= x1 and x=x2 is maximum		CO9	L4

F. EXAM PREPARATION

1. University Model Question Paper

Course:	Engg.Maths-III					Month / Year	May /2018
Crs Code:	18MAT31	Sem:	III	Marks:	100	Time:	180 minutes

-	Note	Answer all FIVE full questions. All questions carry equal marks.	Marks	CO	Level
1	a	*Obtain the Fourier series for* $f(x)=\pi-\lvert x\rvert$ *in the interval* $(-\pi,\pi)$	6	CO1	L4
	b	*find the Sine half range Fourier series of* $f(x)$ *If* $f(x)=¿\begin{cases}-k\ if\ -2<x<0\\ k\ if\ 0<x<2\end{cases}$	7	CO1	L4
	c	*Obtain the Fourier series for y upto first harmonic*	7	CO1	L4
		OR			
-	a	3. compute the constant term and the first two harmonics in the Fourier series of f(x) given by the following table	6	CO1	L4
	b	If f(x) = $\lvert cosx\rvert$ expand f(x) as a Fourier series in the interval (-π , π)	7	CO1	L4
	c	Find the half range cosine series for the function f(x)= $(x-1)^2$ in 0 < x < 1.	7	CO1	L4
2	a	Find the fourier sine and cosine transforms of f(x) = $\begin{cases}x, 0<x<2\\ 0, elsewhere\end{cases}$	6	Co2	L3
	b	Find Z($e^{-an}sinn\theta$) and Z(ncosnθ).	7	CO3	
	c	Solve the difference equation $y_{n+2}+6y_{n+1}+9y_n=2n$ with $y_0=y_1=0$ using Z transforms.	7	CO3	

θ	0	60	120	180	240	300	360
y	0	9.2	14.4	17.8	17.3	11.7	05

X	:	0	1	2	3	4	5
f(x)	:	4	8	15	7	6	2

BS

Prepared by Checked by Approved

		OR			
-	a	Find the inverse Z-transforms of $\frac{Z^3-20Z}{(Z-2)^3(Z-4)}$	6	CO3	L3
	b	Find the Fourier cosine transform of f(x)=e^{-ax} , a≥0 , hence find $\int_0^\infty \frac{\cos\alpha x}{a^2+\alpha^2}$ dx.	7	CO2	L3
	c	Find the Fourier transform of f(x)=$e^{-a\|x\|}$, where a>0.	7	CO2	L3
3	a	By using N-R method find a root of the equation $x\log x_{10}=1.2$.lies near x=2.5	6	CO5	L3
	b	Fit a curve of the form $y=ax+b$for the data and hence find y when x=8 x: 1, 2, 3, 4, 5, 6, 77 y: 87, 97, 113, 129, 202, 195, 193 7	7	CO4	L3
	c	The equation of Regressions lines of 2 variables x and y are y = 0.516x +33.73, x = 0.512y+32.52. Find the correlation coefficient and $\bar{x}$ and$\bar{y}$	7	CO4	L3
		OR			
-	a	Find the third approximate root of $xe^x-2=0$, by Regula-falsi method	6	CO5	L3
	b	**Pressure and volume of the gas are related by the equation** $pv^\gamma=k,\gamma$ **and k being constants , fit this equation** P: 0.5, 1, 1.5, 2, 2.5, 37 v: 1.62, 1, 0.75, 0.62, 0.52, 0.46	7	CO4	L3
	c	Find the coefficient of correlation and Regression lines for the following data x: 1, 2, 3, 4, 5, 6, 7, 8, 9 y: 10, 12, 16, 28, 25, 36, 41, 49, 40	7	CO4	L3
4	a	The population of a town is given by the table : year: 1951, 1961, 1971 Population in thousand: 19.96, 39.65, 58.81 Using newton's forward and backword formula , calculate the increase in population from the year 1955 to 1985.	6	CO6	
	b	Given : x: 0, 1, 2, 3, 4 y: 0, 2, 2.5, 2.3, 2 Evaluate $\int_0^6 y\,dx$ using weddle's rule.	7	CO7	
	c	Given X : 0, 2, 3 F(x) : -4, 2, 14 Find y(4) by Newton's divided difference formula .	7	CO6	
-	a	By dividing the range into 6 equal parts , find the approximate value of $\int_0^\pi e^{\sin x}dx$ using simpon's $(\frac{1}{3})^{rd}$ rule.	6	CO7	

	b	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using simpon's $(\frac{3}{8})^{th}$ rule, taking 7 ordinates.Hence find the approximate value of π.	7	CO7	
	c	Using Lagrange's formula , find the interpolating polynomial that approximate the function described by the following table : X : 0 1 2 3 f(x) : 3 6 11 18 Hence find f(0.5) and f(3.1).	7	CO6	
5	a	Using Green s Theorem evaluate $\oint_c (y-\sin x¿)\,dx+\cos x\,dy$ ¿ where c is the plane triangle enclosed by the lines $y=0, x=\pi/2, y=\frac{2x}{\pi}$	6	CO8	L4
	b	Prove that shortest distance between two points in a plane is a straight line.	7	CO9	L4
	toke S	theorem for $F=(2x-y)i-(yz^2)j-y^2zk$over the surface of $x^2+y^2+z^2=1$ bounded by its projection on the xy-plane	7	CO8	L4
		OR			
	a	If $\vec{f}=3xyi-yj+2xzk$evaluate $\int f.dr$ where C is the curve represented by x=t, $y=t^2$, $z=t^3$ -1< t <1	6	CO8	L4
	b	State and prove Euler's equation.	7	CO9	L4
	c	Solve the Variation problem $\delta\int x^2y^{2}+2y(x+y)dx=0$Given y(1)= y(2)=0	7	Co9	L4

2. SEE Important Questions

Course:	Engg-MathsIII					Month / Year	May /2018	
Crs Code:	18MAT31	Sem:	3	Marks:	100	Time:	180 minutes	
	Note	Answer all FIVE full questions. All questions carry equal marks.				-	-	
Module	Qno.	Important Question				**Marks**	**CO**	**Year**
1	1	Obtain the Fourier series of f(x)= $\frac{\pi-x}{2}$ 0<x<2π and Hence deduce that $\frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}\ldots\ldots\ldots\ldots=\frac{\pi}{4}$.				20	CO1	2008
	2	Fnd the Fourier series for the function f(x)=x(2π-x) over the interval (0 , 2π) and hence deduce that $\frac{\pi^2}{12}=\sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{n^2}$					CO1	2010
	3	f(x) = $\lvert cosx\rvert$ expand f(x) as a Fourier series in the interval (-π , π) .					CO1	2011
	4	Expand the function f(x) =x– x^2 in the interval –π < x < π . Deduce that $\frac{\pi^2}{12}=\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\ldots\ldots\ldots$					CO1	2007
2	1	Find the Fourier transform of f(x)=$e^{-a\lvert x\rvert}$, where a>0.				20	CO2	2005
	2	Find the inverse Fourier transform of $\frac{s}{1+s^2}$.					CO2	2005

	3	Find the Fourier sine and cosine transforms of f(x) = $\begin{cases} x, 0<x<2 \\ 0, elsewhere \end{cases}$		CO2	2009
	4	Find the inverse Z-transforms of $\frac{Z^3 - 20Z}{(Z-2)^3(Z-4)}$		CO3	2009
	5	Solve the difference equation $y_{n+2}+6y_{n+1}+9y_n=2^n$ with $y_0=y_1=0$ using Z transforms.		CO3	2009
3	6	Fit a curve of the form $y=ae^{bx}$ to the following data : x : 77 100 185 239 285 y : 2.4 3.4 7.0 11.1 19.6	20	CO4	2011
	7	Using method of least square, fit a curve $y=ax^b$ for the folling dat 1. X: 2. 1, 3. 2, 4. 3, 5. 4 7. Y: 8. 0.5, 9. 2, 10. 4.5, 11. 8		CO4	2010
	8	Fit a Linear law P=mW+C using data 13. P: 14. 12, 15. 15, 16. 21, 17. 25 18. W: 19. 50, 20. 70, 21. 10, 22. 12		CO4	2011
	9	Find the best values of a and b by fitting the law $V=at^b$ using method of least squares for the data 23. V(f: 24. 35, 25. 40, 26. 50, 27. 60 28. T(: 29. 61, 30. 26, 31. 7, 32. 26		CO4	2011
	10	Fit a 2nd degree polynomial of the form $y=a+bx+cx^2$ for the data : 33. X: 34. 0, 35. 1, 36. 2, 37. 3 40. Y: 41. 1, 42. 3, 43. 7, 44. 13		CO4	2011
4	1	From the following table estimate the number of students who have	20	CO6	

		obtained the marks between 40 and 45 : Marks : 30-40 40-50 50-60 60-70 70-80 Number of students : 31 42 51 35 31			
	2	Using Lagrange's formula , find the interpolating polynomial that approximate the function described by the following table X : 0 1 2 5 f(x) : 2 3 12 147		CO6	2011
	3	Tabulate the values $y=\log_e x$, $4 \le x \le 5.2$, in steps of 0.2 and find $\int_4^{5.2} \log_e x \, dx$ using simpon's $\frac{3}{8}$ rule .		CO6	2011
	4	Evaluate $\int_0^1 \frac{x}{1+x^2} dx$ by using simpon's $(\frac{3}{8})^{th}$ rule, dividing the interval into 3 equal parts. Hence find an approximate value of $\log_e \sqrt{2}$.		CO6	2009
	5	Use Newton's divided difference formula to find f(8) given x: 4 5 7 10 f(x): 48 100 294 900		CO6	2010
5	1	Using Green s Theorem evaluate $\oint_c (y-\sin x¿)\,dx+\cos x dy ¿$ where c is the plane triangle enclosed by the lines $y=0, x=\pi/2, y=\frac{2x}{\pi}$	20	CO8	2014
	2	Verify Stoke s theorem for $F=(2x-y)i-(yz^2)j-y^2 zk$over the surface of $x^2+y^2+z^2=1$bounded by its projection on the xy-plane		CO8	2012
	3	Solve the Variation problem $\delta \int_{\square}^{\square} x^2 y^{2}+2y(x+y)dx=0$Given y(1)= y(2)=0		CO9	2017
	4	If $\vec{f}=3xyi-yj+2xzk$ evaluate $\int f.dr$ where C is the curve represented by x=t, $y=t^2$, $z=t^3$ $-1< t <1$		CO8	2016
	5	State and prove Euler's equation.		CO9	2015