



PL/EN/0000/23/01/16

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Applied Mathematics		LP:
B.Tech : CHEMICAL ENGINEERING	Regulation: 2022	MA22351
Academic Year: 2023-2024		Rev. No.: 00
Sub. Code / Sub. Name : MA22351 -APPLIED MATHEMATICS-III		Date:
Unit I	: Applications of Differential Equations	05.07.2024

Unit Syllabus: Applications of Differential Equations of First Order-Geometrical Applications-Orthogonal Trajectories-Physical Applications-Application of Linear Differential Equations-Simple Harmonic Motions-Deflection of Beams-Applications of Simultaneous Linear Differential Equations.

Objective: Competent in solving applications of ordinary differential equations using analytical methods to obtain their exact solutions

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction to ODE of first order	1-Ch. 12; Pg.751	LCD/BB
2	Geometrical Applications	1-Ch. 12; Pg.751	LCD/BB
3	Pblms. based on Geometrical Applications	1-Ch 12; Pg.752-754	LCD/BB
4	Orthogonal Trajectories	1-Ch. 12; Pg.755	LCD/BB
5	Pblms. based on Orthogonal Trajectories	1-Ch. 12; Pg.755	LCD/BB
6	Physical Applications-Pblms.	1-Ch 12; Pg.758	LCD/BB
7	Application of Linear Differential Equations	1-Ch. 14; Pg.815	LCD/BB
8	Pblms. based on application of Linear Differential Equations	1-Ch 14; Pg.815	LCD/BB
9	Simple Harmonic Motions	1-Ch. 14; Pg.815-820	LCD/BB
10	Deflection of Beams	1-Ch 14; Pg.842-843	LCD/BB
11	Applications of Simultaneous Linear Differential Equations.	1-Ch 14; Pg.846	LCD/BB
12	Tutorial class	Worksheet	LCD/BB
Content beyond syllabus covered (if any): Application in system engineering included.			

* Session duration: 50 mins



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Sub. Code / Sub. Name: MA22351- APPLIED MATHEMATICS-III

Unit II : Partial Differential Equations

Unit Syllabus: Formation of partial differential equations – Singular integrals - Solutions of standard types of first order partial differential equations - Lagrange's linear equation - Linear homogeneous partial differential equations of second and higher order with constant coefficients.

Objective: To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes

Session No *	Topics to be covered	Ref	Teaching Aids
13	Introduction to PDE and Formation of PDE by elimination of arbitrary constants and by elimination of arbitrary functions.	2 – Ch.17; Pg.577-579	LCD/BB
14	Formation of PDE by elimination of arbitrary functions.	2 – Ch.17; Pg.577-579	LCD/BB
15	Tutorial class	Worksheet	LCD/BB
16	Various solutions of a general PDE – complete, singular, particular and general integrals	2 – Ch.17; Pg.579-5584	LCD/BB
17	Solving standard types of PDEs of the form $F(p, q) = 0$.	2 – Ch.17; Pg.584-586	LCD/BB
18	Solving standard types of PDEs of the form $F(z, p, q) = 0$.	2 – Ch.17; Pg.584-586	LCD/BB
19	Solving standard types of PDEs of the form $z = px + qy + f(p, q)$.	2 – Ch.17; Pg.586-587	LCD/BB
20	Solving standard types of PDEs of the form $F_1(x, p) = F_2(y, q)$.	3 – Ch.6; Pg.241-244	LCD/BB
21	Equations reducible to standard forms	Worksheet	LCD/BB
22	Solving Lagrange's linear equation by Method of multipliers	3 – Ch.6; Pg.244-251	LCD/BB
23	Solution of homogeneous linear partial differential equations of second and higher order with constant coefficients.	2 – Ch.17; Pg.590-596	LCD/BB
24	More problems on homogeneous linear partial differential equations of second and higher order with constant coefficients.	2 – Ch.17; Pg.590-596	LCD/BB

Content beyond syllabus covered (if any): Nil

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Sub. Code / Sub. Name: MA22351 – APPLIED MATHEMATICS-III
Unit III : FOURIER SERIES

Unit Syllabus: Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Parseval's identity – Harmonic Analysis.

Objective: To introduce Fourier series analysis this is central to many applications in engineering apart from its uses in solving boundary value problems.

Session No *	Topics to be covered	Ref	Teaching Aids
25	Introduction to periodic functions, Bernoulli's formula, Fourier series and Dirichlet's conditions.	2 – Ch.10; Pg.395-401	LCD/BB
26	General Fourier series and problems based on that.	2 – Ch.10; Pg. 401-408	LCD/BB
27	Fourier series for functions with arbitrary intervals	2 – Ch.10; Pg. 401-408	LCD/BB
28	Tutorial class	Worksheet	LCD/BB
29	Introduction to odd and even functions and Fourier series for odd and even functions	2 – Ch.10; Pg. 408-412 3-Ch.7 Pg. 294-298	LCD/BB
30	Half range cosine series and problems.	2 – Ch.10; Pg. 412-416	LCD/BB
31	Half range sine series and problems.	2 – Ch.10; Pg. 412-416	LCD/BB
32	Tutorial class	Worksheet	LCD/BB
33	RMS value of a function, Derivation of Parseval's Identity	2 – Ch.10; Pg. 418- 419	LCD/BB
34	Problems using Parseval's Identity	2 – Ch.10; Pg. 417- 418	LCD/BB
35	Harmonic analysis for functions with period 2π and arbitrary period	2 – Ch.10; Pg. 420- 423	LCD/BB
36	Tutorial class	2 – Ch.10; Pg. 424- 425	LCD/BB
Content beyond syllabus covered (if any): Application to specific area's included (like medical electronics) heat pulse.			

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Unit IV : BOUNDARY VALUE PROBLEMS

Unit Syllabus: Classification of PDE – Method of separation of variables - Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction (excluding insulated edges).

Objective: Acquire the knowledge of using Fourier series techniques in Boundary value problems

Session No *	Topics to be covered	Ref	Teaching Aids
37	Introduction and Classification of PDE.	2 – Ch.18; Pg. 600	LCD/BB
38	Method of separation of variables.	2 – Ch.18; Pg. 600– 601	LCD/BB
39	Solutions of one dimensional wave equation by method of separation of variables	2 – Ch.18; Pg. 602– 603	LCD/BB
40	Problems on wave equation with the given initial and boundary conditions	2 – Ch.18; Pg. 603– 609	LCD/BB
41	Tutorial class	Worksheet	LCD/BB
42	Solution of one-dimensional heat equation by method of separation of variables	2 – Ch.18; Pg. 611	LCD/BB
43	Problems on heat equation with the given initial and boundary conditions	2 – Ch.18; Pg. 612– 616	LCD/BB
44	Tutorial class	Worksheet	LCD/BB
45	Steady state solution of two dimensional equation of heat conduction by method of separation of variables	2 – Ch.18; Pg. 618– 620	LCD/BB
46	Problems on Laplace equation for a finite plate.	2 – Ch.18; Pg. 621– 623	LCD/BB
47	Problems on Laplace equation for a semi - infinite plate.	2 – Ch.18; Pg. 620– 621	LCD/BB
48	Tutorial class	Worksheet	LCD/BB
<p>Content beyond syllabus covered (if any): Knowledge of heat transfer in circular plate is included.</p>			

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Sub. Code / Sub. Name: MA22351- APPLIED MATHEMATICS-III
Unit V : FOURIER AND Z-TRANSFORMS

Unit Syllabus: Fourier transform pair – Fourier sine and cosine transforms – Properties (without proof) – Convolution theorem – Parseval’s identity. Z- Transforms – Elementary properties – Inverse Z - transform (using partial fraction) – Convolution theorem – Solution of difference equations using Z - transform

Objective: Achieve an understanding of the basic concepts of the Fourier transform and Z-transform techniques and its application in Engineering.

Session No *	Topics to be covered	Ref	Teaching Aids
49	Fourier transforms pair and problems.	2 – Ch.22; Pg.769-772	LCD BB
50	Fourier cosine and sine transform and problems	2 – Ch.22; Pg.769& Pg.772-777	LCD BB
51	Properties of Fourier transforms,	3– Ch.8; Pg.4 – 7	LCD BB
52	Properties of Fourier sine transforms and cosine transforms.	3– Ch.8; Pg.4 – 7	LCD BB
53	Problems on properties of Fourier transforms, Fourier sine transforms and cosine transforms.	3– Ch.8; Pg.4 – 7 Pg.23 – 24	LCD BB
54	Derivation of Convolution theorem and Parseval’s identity for Fourier transforms	2 – Ch.22; Pg.777-778	LCD BB
55	Introduction to Z- transforms and Elementary properties of Z-transforms	2 – Ch.23; Pg.793	LCD BB
56	Problems based on elementary properties of Z-transforms	2 – Ch.23; Pg.793-799	LCD BB
57	Inverse Z – transform using partial fraction	2 – Ch.23; Pg.805-806	LCD BB
58	Inverse Z – transform using Convolution theorem.	2 – Ch.23; Pg.802	LCD BB
59	Formation of difference equations	2 – Ch.23; Pg.808	LCD BB
60	Solution of difference equation using Z-transforms	2 – Ch.23; Pg.808-811	LCD BB
Content beyond syllabus covered (if any): Applications of transforms.			

* Session duration: 50 mins



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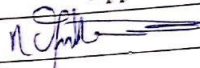
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TEXT BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, Wiley India, 2011.
2. Grewal. B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, Delhi 2012.
3. Narayanan.S., Manicavachagom Pillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students" Vol. II & III, S.Viswanathan Publishers Pvt. Ltd. 1998.

REFERENCES:

1. Bali.N.P. and Manish Goyal, "A Textbook of Engineering Mathematics", 8th Edition, Laxmi Publications Pvt Ltd, 2007.
2. Glyn James, "Advanced Modern Engineering Mathematics", 4th Edition, Pearson Education, 2011.
3. Veerarajan. T., "Transforms and Partial Differential Equations", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2012.
4. Ray Wylie. C and Barrett.L.C, "Advanced Engineering Mathematics" Tata McGraw Hill Education Pvt Ltd, New Delhi, 2012.
5. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt. Ltd. 7th Edition, New Delhi, 2012.

	Prepared by	Approved by
Signature		
Name	Dr.J.Vijayarangam	Dr. R. MUTHUCUMARASWAMY
Designation	Assistant Professor	Professor and Head
Date	05/07/2024	05/07/2024
Remarks *: -		
Remarks *: -		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD