SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Applied Mathematics	LP: MA22354
B.E/B.Tech : **Common to BT/CE/CH/EC/EE/ME** Regulation: 2022	Rev. No.: 00
Academic Year: 2023-2024	Date: 01.08.2023
Sub. Code / Sub. Name : MA22354 – Mathematics for Electrical Engineers	
Unit II : 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 understand the basic concepts of the Fourier series and to describe a periodic signal in terms of cosine and sine waves.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction to periodic functions, Bernoulli's formula, Fourier series and Dirichlet's conditions.	2 – Ch.10; Pg.395-401	LCD/BB
2	General Fourier series and problems based on that.	2 – Ch.10; Pg. 401-408	LCD/BB
3	Fourier series for functions with arbitrary intervals	2 – Ch.10; Pg. 401-408	LCD/BB
4	Tutorial class	Worksheet	LCD/BB
5	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
6	Half range cosine series and problems.	2 – Ch.10; Pg. 412-416	LCD/BB
7	Half range sine series and problems.	2 – Ch.10; Pg. 412-416	LCD/BB
8	Tutorial class	Worksheet	LCD/BB
9	RMS value of a function, Derivation of Parseval's Identity	2 – Ch.10; Pg. 418- 419	LCD/BB
10	Problems using Parseval's Identity	2 – Ch.10; Pg. 417- 418	LCD/BB
11	Harmonic analysis for functions with period 2π and arbitrary period	2 – Ch.10; Pg. 420- 423	LCD/BB
12	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.

*** Session duration: 50 minutes**

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Sub. Code / Sub. Name: MA22354 –Mathematics for Electrical Engineers

Unit III : Applications of Partial Differential Equations

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: Understand the application of partial differential equations in heat transfer problems.

Session No *	Topics to be covered	Ref	Teaching Aids
13	Introduction and Classification of PDE.	2 – Ch.18; Pg. 600	LCD/BB
14	Method of separation of variables.	2 – Ch.18; Pg. 600– 601	LCD/BB
15	Solutions of one dimensional wave equation by method of separation of variables	2 – Ch.18; Pg. 602– 603	LCD/BB
16	Problems on wave equation with the given initial and boundary conditions	2 – Ch.18; Pg. 603– 609	LCD/BB
17	Tutorial class	Worksheet	LCD/BB
	FAT-I		
18	Solution of one-dimensional heat equation by method of separation of variables	2 – Ch.18; Pg. 611	LCD/BB
19	Problems on heat equation with the given initial and boundary conditions	2 – Ch.18; Pg. 612– 616	LCD/BB
20	Tutorial class	Worksheet	LCD/BB
21	Steady state solution of two dimensional equation of heat conduction by method of separation of variables	2 – Ch.18; Pg. 618– 620	LCD/BB
22	Problems on Laplace equation for a finite plate.	2 – Ch.18; Pg. 621– 623	LCD/BB
23	Problems on Laplace equation for a semi - infinite plate.	2 – Ch.18; Pg. 620– 621	LCD/BB
24	Tutorial class	Worksheet	LCD/BB

Content beyond syllabus covered (if any):
Knowledge of heat transfer in circular plate is included.

*** Session duration: 50 mins**

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Unit IV : Fourier Transforms

Unit Syllabus: Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

Objective: To understand the basic concepts of the Fourier, transform techniques and its application in engineering.

Session No *	Topics to be covered	Ref	Teaching Aids
25	Introduction to infinite Fourier transform and Fourier integral theorem	2 – Ch.22; Pg.766-768	LCD/BB
26	Fourier transforms pair and problems.	2 – Ch.22; Pg.769-772	LCD/BB
27	More problems on Fourier transform pair	2 – Ch.22; Pg.769-772	LCD/BB
28	Tutorial class	Worksheet	LCD/BB
29	Fourier cosine and sine transform and problems	2 – Ch.22; Pg.769& Pg.772-777	LCD/BB
30	More problems on Fourier cosine and sine transform	2 – Ch.22; Pg.769& Pg.772-777	LCD/BB
31	Properties of Fourier transforms,	3– Ch.8; Pg.4 – 7 Pg.23 – 24	LCD/BB
32	Properties of Fourier sine transforms and cosine transforms.	3– Ch.8; Pg.4 – 7 Pg.23 – 24	LCD/BB
33	Problems on properties of Fourier transforms, Fourier sine transforms and cosine transforms.	3– Ch.8; Pg.4 – 7 Pg.23 – 24	LCD/BB
34	Transforms of simple functions and problems.	3– Ch.8; Pg.4 – 7 Pg.23 – 24	LCD/BB
35	Derivation of Convolution theorem and Parseval's identity for Fourier transforms	2 – Ch.22; Pg.777-778	LCD/BB
36	Problems using Parseval's identity and convolution theorem	2 – Ch.22; Pg.778-779	LCD/BB
	FAT-II		
Content beyond syllabus covered (if any): Applications of transforms.			

* Session duration: 50 mins

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Unit V : Z -Transforms and Difference Equations

Unit Syllabus: Z- Transforms - Elementary properties – Inverse Z - transform (using partial fraction, long division method and residue technique) – Convolution theorem - Formation of difference equations – Solution of difference equations using Z - transform.

Objective: To convert the difference equations of discrete time systems in Z transform to algebraic equations which simplifies the discrete time system analysis.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Introduction to Z- transforms and Elementary properties of Z-transforms	2 – Ch.23; Pg.793	LCD/BB
38	Problems based on elementary properties of Z-transforms	2 – Ch.23; Pg.793-799	LCD/BB
39	Initial and Final value theorems on Z – transforms.	2 – Ch.23; Pg.799-800	LCD/BB
40	Inverse Z – transform using partial fraction	2 – Ch.23; Pg.805-806	LCD/BB
41	Inverse Z – transform using long division method	2 – Ch.23; Pg.805	LCD/BB
42	Inverse Z – transform using residues	2 – Ch.23; Pg.806-807	LCD/BB
43	Derivation of Convolution theorem.	2 – Ch.23; Pg.802,807	LCD/BB
44	Inverse Z – transform using Convolution theorem.	2 – Ch.23; Pg.802	LCD/BB
45	Tutorial class	Worksheet	LCD/BB
46	Formation of difference equations	2 – Ch.23; Pg.808	LCD/BB
47	Solution of difference equation using Z-transforms	2 – Ch.23; Pg.808-811	LCD/BB
48	Tutorial class	Worksheet	LCD/BB

Content beyond syllabus covered (if any):
Application in system engineering included.

*** Session duration: 50 mins**

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Unit I : 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: Skilled at the techniques of solving partial differential equations.

Session No *	Topics to be covered	Ref	Teaching Aids
49	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
50	Formation of PDE by elimination of arbitrary functions.	2 – Ch.17; Pg.577-579	LCD/BB
51	Tutorial class	Worksheet	LCD/BB
52	Various solutions of a general PDE – complete, singular, particular and general integrals	2 – Ch.17; Pg.579-5584	LCD/BB
53	Solving standard types of PDEs of the form $F(p, q) = 0$ and $F(z, p,q)=0$.	2 – Ch.17; Pg.584-586	LCD/BB
54	Solving standard types of PDEs of the form $z = px+qy +f(p, q)$ and $F_1(x, p)=F_2(y,q)$.	2 – Ch.17; Pg.586-587	LCD/BB
55	Equations reducible to standard forms	3 – Ch.6; Pg.241-244	LCD/BB
56	Tutorial class	Worksheet	LCD/BB
57	Solving Lagrange's linear equation by Method of multipliers	3 – Ch.6; Pg.244-251	LCD/BB
58	Tutorial class	Worksheet	LCD/BB
59	Solution of homogeneous linear partial differential equations of second and higher order with constant coefficients.	2 – Ch.17; Pg.590-596	LCD/BB
60	More problems on homogeneous linear partial differential equations of second and higher order with constant coefficients.	2 – Ch.17; Pg.590-596	LCD/BB
	FAT-III		
Content beyond syllabus covered (if any): Nil			

*** Session duration: 50 mins**

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TEXT BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", *10* th 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", 7th 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 MGraw 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.

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Date	1/08/2023	1/08/2023
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