SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Applied Mathematics	LP: MA18351
B.E/B.Tech : Common to BT/CE/CH/EC/EE/MERegulation: 2018	Rev. No.: 00
Sub. Code / Sub. Name : MA18351 –Engineering Mathematics- III	Date: 20.08.2021
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 introduce Fourier series analysis this is central to many applications in engineering apartfrom its uses in solving boundary value problems.

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: MA18351 – Engineering Mathematics - III
UnitIII :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: To understand the application of the Fourier series concept in Boundary value 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
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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Sub. Code / Sub. Name: MA18351– Engineering Mathematics - III
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
	Continuous Assessment Test-I		
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
Content beyond syllabus covered (if any): Applications of transforms.			

* Session duration: 50 mins

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Sub. Code / Sub. Name: MA18351 –Engineering Mathematics - III
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 develop Z transform techniques for discrete time systems.

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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Sub. Code / Sub. Name: MA18351-Engineering Mathematics III

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

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
	Continuous Assessment Test-II		
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 "AdvancedMathematics forEngineering Students" Vol. II & III, S.Viswanathan Publishers Pvt. Ltd. 1998.

REFERENCES:

1. Bali.N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 7[th]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 PublishingCompany 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	20/08/2021	20/08/2021
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