

Discrete and Integral Transforms

UG – III Semester (Common to EC, TC, EE, ML, EI, IS)

Course code: 18MA3GCDIT

Credits: 03

L: P: T: S: 3:1:0:0

CIE Marks: 50

Exam Hours: 03

SEE Marks: 50

Course Objectives:

1. Generalize a periodic function as a sum of series of trigonometric functions using Fourier series
2. Explain the concept of Fourier and Z transform and state the use of it in time varying signals (continuous).
3. Introduce Programming lab for Descriptive statistics

Course Outcomes: At the end of the course, student will be able to:

CO1	Use Method of Least Square for finding best fit Curves
CO2	Use software to analyze statistical data to standard typology
CO3	Apply Z - Transform to solve Difference Equations
CO4	Expand a periodic function as trigonometric series (Fourier series).
CO5	Apply Laplace Transform to solve ordinary differential equation
CO6	Demonstrate Fourier Transform as a tool for solving Integral equations.

Mapping of Course outcomes to Program outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	1								
CO2	3	3	2	1								
CO3	3	3	1	1								
CO4	3	3	2	1								
CO5	3	3	2	1								
CO6	3	3	2	1								

Module	Contents of the Module	Hours	CO's
1	Curve Fitting & Statistics : <u>Curve Fitting:</u> Curve fitting by the method of least squares, Fitting a straight line and parabola <u>Statistics Modeling:</u> Analyzing a data - Mean, Standard deviation-combination of two groups, correlation, Linear regression. Application Problems	8	CO1, CO2
2	Z-Transforms: Definition, Standard Z-transforms, Damping rule, Shifting rule, Initial value and final value theorems (without proof), Inverse Z-Transforms, Application of Z-transforms to solve difference equations. Application Problems	8	CO3
3	Fourier Series Periodic functions, Dirichlet's conditions, Fourier series of periodic functions of period 2π and with arbitrary period $2l$, Half-range Fourier sine and cosine series, Practical Harmonic Analysis. Application Problems	8	CO4
4	Integral Transforms –I <u>Laplace Transform:</u> Definition and Laplace Transforms of Elementary functions, Laplace Transforms of $e^{at}f(t)$, $t^n f(t)$, $\frac{f(t)}{t}$, Periodic functions, Unit Impulse function (statements only)-problems. <u>Inverse Laplace Transforms:</u> Inverse Laplace Transforms of Logarithmic and Trigonometric functions, Inverse Laplace transform by the method of Partial Fractions. Convolution Theorem(statement only)-problems. Application Problems	8	CO5
5	Integral Transforms –II <u>Fourier Transform:</u> Infinite Fourier transform, Infinite Fourier sine and cosine transforms, Inverse Fourier transforms, Inverse Fourier sine and cosine transforms, Convolution theorem (without proof), Parseval's identity- problems. Application Problems	8	CO6

Text Books:

1. B.S. Grewal, "Higher Engineering Mathematics" Khanna Publishers, 43rd Edition, 2014 June, ISBN:9788174091956.
2. Erwin Kreyszig; Advanced Engineering Mathematics; John Wiley & Sons, 9th Edition, 2007, ISBN: 9788126531356.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

References:

1. B.V.Ramana, "Higher Engineering Mathematics", Tata Mc Graw-Hill, 2006; ISBN:9780070634190.
2. M. K. Jain, S. R. K. Iyengar and R. K. Jain "Numerical Methods: For Scientific and Engineering Computation", New Age International Publications, 6th Edition, 2012, ISBN: 9788122433234.
3. Murray Spiegel, Schaum's Outline of "Advanced Mathematics for Engineers and Scientists" McGraw-Hill, 1971; ISBN: 9780070602168.

Self-study component:

UNIT 1: Weighted mean, Rank Correlation - Programming

UNIT 2: Region of convergence

UNIT 3: Fourier Integral Theorem -Proof

UNIT 4: Laplace Transform of Unit step function.

UNIT 5: Properties of Fourier Transform

DAYANANDA SAGAR COLLEGE OF ENGINEERING
DEPARTMENT OF MATHEMATICS
LESSON PLAN for ODD semester: 2019



Subject: Discrete and Integral Transforms
Subject Code: 18MA3GCDIT

Class: IS-A Sem: III
Staff: Dr. Radha Gupta

Week	Hour	Date	Details of Portion coverage
			Module 1: Curve Fitting & Statistics :
1	1	17-08-2019	<u>Curve Fitting</u> : Curve fitting by the method of least squares, Fitting a straight line -Problems
2	1	19-08-2019	Curve Fitting a parabola -Problems
2	1	20-08-2019	<u>Statistics Modeling</u> : Analyzing a data – Mean-Problems
2	1	21-08-2019	Standard deviation-combination of two groups-Problems
3	1	26-08-2019	Some more problems on Standard deviation
3	1	27-08-2019	Correlation-Problems
3	1	28-08-2019	Linear regression-Problems
4	1	03-09-2019	Application Problems
			Lab session
4	1	04-09-2019	Tutorial class-Miscellaneous problems
5	1	09-09-2019	Module 2:Z-Transforms : Definition, Standard Z-transforms
5	1	10-09-2019	Damping rule, Shifting rule -Problems
5	1	11-09-2019	Initial value and final value theorems (without proof)-Problems
6	1	16-09-2019	Some more problems on Initial value theorem
6	1	17-09-2019	Inverse Z-Transforms-Definition, Standard formula-Problems
6	1	18-09-2019	Some more problems on Inverse Z-Transforms
7	1	23-09-2019	Application of Z-transforms to solve difference equations-Problems
7	1	24-09-2019	Some more problems on Z-transforms to solve difference equations
			Lab session
7	1	25-09-2019	Tutorial class-Miscellaneous problems
8	1	30-09-2019	Module 3: Fourier Series : Periodic functions, Dirichlet's conditions, Fourier series of periodic functions of period 2π -Problems
8	1	01-10-2019	Some more problems on Fourier series of periodic functions of period 2π
8	1	09-10-2019	Fourier series of periodic functions of period $2l$ -Problems
9	1	14-10-2019	Some more problems on Fourier series of periodic functions of period $2l$
9	1	15-10-2019	Half-range Fourier sine series-Problems
9	1	16-10-2019	Half-range Fourier cosine series-Problems
10	1	21-10-2019	Practical Harmonic Analysis-Problems
10	1	22-10-2019	Application Problems
			Lab Session
10	1	23-10-2019	Tutorial class-Miscellaneous problems
11	1	28-10-2019	Module 4: Integral Transforms –I: Laplace Transform :Definition and Laplace Transforms of Elementary functions –Simple problems
11	1	30-10-2019	Laplace Transforms of $e^{at}f(t)$, $t^n f(t)$, $\frac{f(t)}{t}$ - Problems
12	1	04-11-2019	Laplace Transforms of Periodic functions -Problems
12	1	05-11-2019	Laplace Transforms of Unit Impulse function (statements only)-problems.
12	1	06-11-2019	<u>Inverse Laplace Transforms</u> : Inverse Laplace Transforms of Logarithmic and Trigonometric functions -Problems
13	1	11-11-2019	Inverse Laplace transform by the method of Partial Fractions-Problems
13	1	12-11-2019	Convolution Theorem (statement only)-problems.
13	1	13-11-2019	Application Problems
			Lab session

14	1	18-11-2019	Tutorial class-Miscellaneous problems
14	1	19-11-2019	Module 5: Integral Transforms –II : <u>Fourier Transform:</u> Infinite Fourier transform-Problems
14	1	20-11-2019	Problems on Infinite Fourier transform
15	1	25-11-2019	Infinite Fourier sine transforms - Problems
15	1	26-11-2019	Infinite Fourier cosine transforms- Problems
15	1	27-11-2019	Some more problems on Infinite Fourier sine and cosine transforms
16	1	02-12-2019	Convolution theorem (without proof)-Problems
16	1	03-12-2019	Parseval's identity- problems
16	1	04-12-2019	Application Problems
			Lab session
17	1	07-12-2019	Tutorial class-Miscellaneous problems

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed. (Reprint), 2016.
3. E. Kreyszig: Advanced Engineering Mathematics Volume I, John Wiley & Sons, 2014.
4. E.K reyszig: Advanced Engineering Mathematics Volume II, John Wiley & Sons, 2014.

Reference Books:

1. C. Ray Wylie, Louis C. Barrett: "Advanced Engineering Mathematics", 6th Edition, McGraw-Hill Book Co., New York, 1995.
2. N.P. Bali and Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers, 7th Ed., 2010.
3. B.V.Ramana: "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Veerarajan T., "Engineering Mathematics for First year", Tata McGraw-Hill, 2008.
5. Thomas G.B. and Finney R.L. "Calculus and Analytical Geometry" 9th Edition, Pearson, 2012.
- 6.

Internal Dates:

- 1st CIE : 16.09.2019 to 18.09.2019**
2nd CIE : 17.10.2019 to 19.10.2019
3rd CIE : 18.11.2019 to 20.11.2019

Signature of the HOD