22EE210	**MATRICES AND TRANSFORMS**	Category	L	T	P	Credit
		BSC	3	1	0	4

Preamble

An Electrical engineering student needs to know the concept of Eigen value problem for construction of engineering modelling. Also mathematical tools Laplace Transforms, Fourier Transforms are very much essential to solve ordinary differential equations, partial differential equations, integral equations and related initial and boundary value problems. The course is designed to impart the knowledge and understanding the concepts of Fourier series for approximation of periodic functions and apply them in their area of specialization.

Prerequisite

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

COs	Course Outcomes	TCE Proficiency Scale	Expected Proficiency in %	Expected Attainment Level %
CO1	Estimate the Eigen values and Eigen vectors of a square matrix	TPS3	75	70
CO2	Reduce the Quadratic form to Canonical Form using diagonalization.	TPS3	75	70
CO3	Determine Laplace Transform and Inverse Laplace Transform	TPS3	70	65
CO4	Solve initial value problem using Laplace transform.	TPS3	70	65
CO5	Represent the function into infinite Fourier trigonometric series.	TPS3	75	70
CO6	Determine the value of improper integrals and solve integral equation using Fourier Transform.	TPS3	75	70

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S		S	-	-	-	-	-	-	-	S	S	S
CO2	S	S		S	-	-	-	-	-	-	-	S	S	S
CO3	S	M			-	-	-	-		-		-		S	S
CO4	S	S	S			-	-	-	-	M	-	-	M	S	S
CO5	S	S	S		M	-	-	-	M	-	-	M	S	S
CO6	S	S	S		M	-	-	-	M	-	-	M	S	S

S- Strong; M-Medium; L-Low

Assessment Pattern

Bloom's Scale CO	Assessment - I						Assessment - II						Terminal Exam (%)		
	CAT – I (%)			Assg. I (%)			CAT – II (%)			Assg. II (%)					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
CO1	4	-	13	-	-	100	-	-	-	-	-	100	-	-	8
CO2	3	10	20	-	-		-	-	-	-	-		-	5	11
CO3	3	10	25	-	-		-	-	-	-	-		-	5	13
CO4	-	-	12	-	-		-	-	-	-	-		-	-	8
CO5	-	-	-	-	-	-	5	10	35	-	-	100	-	10	15
CO6	-	-	-	-	-	-	5	10	35	-	-		-	10	15
Total	10	20	70	-	-	100	10	20	70	-	-	100	-	30	70

*Terminal examination should cover all Course Outcomes in the appropriate TPS Scale level.

Syllabus

MATRIX EIGEN VALUE PROBLEM: Eigenvalues and Eigenvectors – Properties of Eigen values –Reduction to Diagonal form - Reduction of Quadratic forms to Canonical Form.

LAPLACE TRANSFROMS: Laplace transform -Properties –Transforms of Periodic Functions - Transforms of derivatives and integrals – Evaluations of integrals by Laplace Transform – Inverse Transform - Convolution – Application to Differential Equations.

FOURIER SERIES: Fourier series in (0, 2π) –Even and Odd functions – Half-range Sine and Cosine series – Complex Form of Fourier Series - Harmonic Analysis.

FOURIER TRANSFORM: Fourier transform – Properties of Fourier Transforms – Fourier Sine and cosine transforms – Convolution theorem – Parseval's identity – Discrete Fourier Transform.

Text Book

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, New Delhi, 2012.

Reference Books& web resources

1. Erwin Kreszig, "Advanced Engineering Mathematics",10th edition, Wiley, 2017.
2. Glyn James, "Advanced Modern Engineering Mathematics", Pearson Education, 4th Edition, New Delhi, 2011.

3. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, 7th Edition, New Delhi, 2012.
4. John Bird, "Higher Engineering Mathematics", Fifth edition, Published by Elsevier Ltd., 2006.

Course Contents and Lecture Schedule

Module No.	Topic	No. of Periods
1	**MATRIX EIGEN VALUE PROBLEM**	
1.1	Eigenvalues and Eigenvectors	2
1.2	Properties of Eigen values	1
	Tutorial	**1**
1.3	Reduction to Diagonal form	3

Module No.	Topic	No. of Periods
	Tutorial	**1**
1.4	Reduction of Quadratic forms to Canonical Form.	3
	Tutorial	**1**
2	**LAPLACE TRANSFROMS**	
2.1	Laplace transform -Properties	1
2.2	Transforms of Periodic Functions	1
2.3	Transforms of derivatives and integrals	2
	Tutorial	**1**
2.4	Evaluations of integrals by Laplace Transform	1
2.5	Inverse Transform	2
	Tutorial	**1**
2.6	Convolution	1
2.7	Application to Differential Equations	2
3	**FOURIER SERIES**	
3.1	Fourier series in (0, 2π)	2
3.2	Even and Odd functions	2
	Tutorial	**1**
3.3	Half-range Sine and Cosine series	2
3.4	Complex Form of Fourier Series	2
	Tutorial	**1**
3.5	Harmonic Analysis	2
4	**FOURIER TRANSFORM**	
4.1	Fourier transform	2
	Tutorial	**1**
4.2	Properties of Fourier Transforms	2
4.3	Fourier Sine and cosine transforms	1
	Tutorial	**1**
4.4	Convolution theorem	2
4.5	Parseval's identity	1
4.6	Discrete Fourier Transform	1
	Tutorial	**1**
	Total	48

Course Designer(s):

1. Dr. R. Rammohan, Professor, Mathematics   rr_maths@tce.edu

2. Dr. L. Muthusubramaniam,   lmsmat@tce.edu

   Assistant Professor, Mathematics
3. Dr. S. Suriyakala, Assistant Professor ,Mathematics   ssamat@tce.edu