

Department Name: Mathematics

Semester - III

Course Title: Integral Transform	Course Code: 24MJMA3S
Total Contact Hours: 3Hrs/Week	No. of Credits:2
L:T:P-1:0:2	
Internal Assessment Marks:10	Duration of SEE: 1.5 Hours
Semester End Exam Marks: 40	

Course Outcomes (COs):

At the end of the course, students will be able to:

1. Find Laplace transform of some basic functions.
2. Apply Convolution theorem for solving problems.
3. Learn Free and Open Source software (FOSS) tools or computer programming.
4. Find Laplace transform of various functions
5. Find the Fourier Transform of periodic functions
6. Solve differential equations by using Integral transforms.

Unit	Description	Hours
1	Laplace transforms: Definition and basic properties. Laplace transforms of some common functions, Laplace transforms of the derivatives and the integral of the function, Convolution theorem (without proof). Inverse Laplace transforms: Application to ordinary linear differential equation of first and second order with constant co-efficient, solving the system of first order simultaneous differential equations.	7
2	Fourier Series: Periodic function, Fourier series of function with period 2π and period $2L$. Half range cosine and sine series, Complex form of Fourier series. Fourier transforms: Definition and basic properties. Fourier integrals, Fourier sine and cosine integral, Fourier sine and cosine transforms. Properties of Fourier Transforms.	7
3	Programs using Scilab/Maxima/Python: Elements of Integral transforms using FOSS 1. Program to find the Laplace transforms of some standard and periodic functions. 2. Program find the inverse Laplace transform of simple functions 3. Program to verify of Convolution Theorem for Laplace transform. 4. Program to solve a first order ordinary linear differential equation using Laplace transform.	

	<ol style="list-style-type: none">5. Python program that solves a second-order ordinary linear differential equation using the Laplace transform6. Program to solve a system of first-order simultaneous differential equations7. Program to solve Integral equation using Laplace transform.8. Program to find Cosine Fourier transforms.9. Program to find sine Fourier transforms.10. Program to verify of Convolution Theorem for Fourier transform.	
<p>References:</p> <ol style="list-style-type: none">1. Laplace transforms by S K Anand (Sarup and Sons New Delhi)2. Fourier Transforms by Ian. Sneddon (Dover Publications)3. Murry. R. Spiegel: Laplace transforms (schaum's Outline Series)4. Dr.B.S.Grewal: Higher Engineering Mathematics, Khanna Publishers.		
