Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
BSC-302	Mathematics-III	BSC	5	4	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to: -	
CO1	Learn the basics of different numerical methods for solving differential equations.
CO2	Explain the concept of Laplace Transform of various functions and its applications and derivatives.
CO3	Use different methods of Inverse Laplace transform to solve ODE and PDE.
CO4	Understand the idea of Fourier series, odd and even functions and its Fourier expansions to solve second order ODEs.
CO5	Apply the concepts of Fourier transform and its properties to solve integral equations and PDEs

Detailed Syllabus

Section-A

Unit 1: Numerical differentiation, numerical integration: trapezoidal rule and Simpson's 1/3rd rule. numerical solutions of algebraic and transcendental equations by regulafalsi, Newton Raphson and direct iterative methods, solution of differential equations by Taylor's method, Picard's method, Euler and modified Euler's methods. Runge-kutta method of fourth order for solving first and second order equations.

(10 Hrs)

Unit 2: Laplace transforms: Definition and existence of Laplace transforms, Laplace transform, properties of Laplace transform, unit step function, impulse function, applications to solve initial and boundary value problems. Laplace transform of periodic functions, Laplace transform of derivatives.

(8 Hrs)

Unit 3: Inverse Laplace: Definition and existence of inverse Laplace transform Inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, ordinary and higher order differential equations and partial differential equations by Laplace transform methods.

(10 Hrs)

Section-B

Unit 4: Fourier series: Introduction, Euler's formula, sufficient conditions for a Fourier expansion, functions having points of discontinuity, change of intervals. Odd and even functions and Fourier expansion of odd and even periodic functions, half range series, typical waveforms, Parseval's formula. Power series, solutions of second order ODE.

(10 Hrs)

Unit 5: Fourier transform: Fourier integrals, Fourier transform Fourier integral theorem, and their inverses. Properties of Fourier transforms, application of Fourier transform to solve integral equations. Fourier sine and cosine integrals, and their inverses. Solutions of PDEs by Fourier transform. **(8 Hrs)**

Text Books

S.No	Name of the Suggested Books	Name of Author	Publisher Name	Edition (Pub. Yr.)
1	Engineering Mathematics	B.S. Grewal	Khanna Publications, New Delhi	44th (2018)
2	Engineering Mathematics	N.P. Bali and M. Goyal	Laxmi Publications	10th (2019)
3	Differential Equations and Laplace Transforms	Veerarajan T	Yes Dee Publishing	1st (2020)

Reference Books

S.No.	Name of the Book	Name of Author	Publisher Name	Edition (Pub. Yr.)
1	Advanced Engineering Mathematics	Kreyszig E.	John Wiley	10th (2011)
2	Engineering Mathematics	Babu R.	Pearson	2nd (2012)
3	Schaum's Outline of Laplace Transforms (Schaum's outlines of theory and problems)	Murray R. Spiegel	McGraw-Hill	1st (1965)
4	Complex analysis and Numerical Methods	Dr. Bhopinder Singh	Kirti Publishers	2nd (2017)