Part A: Introduction				
Program: **Degree Course**		Class: **B.Sc.**	Semester: **Sixth**	Session:**2024-2025**
1	Course Code	**PSE – 05T**		
2	Course Title	**MATHEMATICAL PHYSICS**		
3	Course Type	**Theory**		
4	Pre-requisite (if any)	NO		
5	Course Learning Outcomes (CLO)	**After completion of the course students will be able to:** • Solve differential equations like Legendre, Bessel and Hermite that are common in physical sciences. • Solve the different partial differential equations encountered in physical problems and draw inferences from solutions. • Solve transfer functions in Instrumentation using Laplace transforms. • Apply Fourier transforms in Holography. • Apply Matrices in the study of electrical circuits, Quantum Mechanics and Optics.		
6	**Credit Value**	**Theory : 3**		
7	**Total Marks**	**Max. Marks: 100**	**Min Passing Marks : 40**	

Part B: Content of the Course		
Total Hours: 45		
Unit	**Topic**	**Number of Hours**
I	**Calculus of functions of more than one variable**: Partial derivatives, exact and inexact differentials. Integrating factor, with simple illustration. Constrained Maximization using Lagrange Multipliers. **Frobenius Method and Special Functions**: Singular Points of Second Order Linear Differential Equations and their importance. Frobenius method and its applications to differential equations.	**12**
II	**Special Functions:** Legendre, Bessel, Hermite and Laguerre Differential Equations. Properties of Legendre Polynomials: Rodrigues Formula, Orthogonality. Simple recurrence relations.	**11**
III	**Fourier Series**: Periodic functions. Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only). Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients. Complex representation of Fourier series. Expansion of functions with arbitrary period. Expansion of non-periodic functions over an interval. Even and odd functions and their Fourier expansions. Application. Summing of Infinite Series.	**11**
IV	**Some Special Integrals:** Beta and Gamma Functions and Relation between them. Expression of Integrals in terms of Gamma Functions. Error Function	**11**

	(Probability Integral). **Partial Differential Equations**: Solutions to partial differential equations, using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry.	