

Programme: B.Sc. (Hons.) Class: B.Sc.	Year: IV	Semester: VII
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Subject: Mathematics

Course Code: **Course Title: Advanced Differential Equation**

Course Outcome
CO1: Identifying and obtaining the solution of first order differential equation by Picard's Methods and basic knowledge of linear differential equations of second order.
CO2: Analyze the application of partial differential equation in terms of wave heat and Laplace equations.
CO3: Student will be able to understand the ordinary and singular points and how to solve power series.
CO4: Students will be able to understand basics of partial differential equations of first order, linear and non-linear partial differential equations.
CO5: Obtaining the solution of Linear partial differential equations with constant coefficients.

Unit No.	Course Content	Hours
I	The Existence and Uniqueness of solutions : The method of successive approximation, Picard's Existence and Uniqueness theorem, Ordinary and regular singular points, Power series solution, Series solution (Frobenius method) of first and second order linear equations.	12
II	Legendre and Bessel Functions and their recursion formulae, Integral representation and properties.	12
III	Solution of linear partial differential equations of second order with variable coefficients, Applications to the vibrational mechanical systems.	12
IV	Linear homogeneous boundary value problems: Eigenvalues, Eigenfunctions, Sturm-Liouville boundary value problems. Non-homogeneous boundary value problems: Non-homogeneous Sturm-Liouville boundary value problems	12
V	Wave equation, Laplace equation and Heat conduction equation, Their solutions by method of separation of variables and applications.	12

Suggested Readings:

1. M.D.Raisinghania: Advanced Differential Equations (S Chand)
2. Shepley L. Ross: Differential Equations (Wiley India)
3. I. N. Sneddon: Elements of Partial Differential Equations, McGraw Hill Book Company.
4. S G Deo , V Raghavendra, R Kar, V Laksmikanthan : Text book of Ordinary Differential Equations (McGraw Hill Education)
5. Suggested digital platform:NPTEL/SWAYAM/MOOCs

Mapping of course outcomes with program outcomes & program specific outcomes

CO's/ No.	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03	PS04
CO1	3	3	3	3	1	2	2	3	3
CO2	3	3	3	3	1	2	2	3	3
CO3	3	3	3	3	1	2	2	3	3
CO4	3	3	3	3	1	2	2	3	3
CO5	3	3	3	3	1	2	2	3	3