

Subject Code: 1SC2040203	Subject Title: METHODS OF PARTIAL DIFFERENTIAL EQUATIONS
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Course Objective:

- The objective of the course is to introduce Origin of second order partial differential equations and some special functions that appear in different venues of applied mathematics.

Teaching scheme (hours) per week		Credit			Theory Marks		Practical Marks		Total
Lecture	Tutorial	Theory	Practical	Total	Uni. Assessment	Cont. Assessment	Uni. Assessment	Cont. Assessment	
4	1	5	-	5	60	40	--	--	100

Subject Contents			
Unit. No	Topic	Total Hours	Weight (%)
1	Origin of second order partial differential equations, linear second order partial differential equations with constant coefficients, solutions for $f(x; y)$ to be polynomial, exponential, sin/cos functions, general method for homogeneous equations.	18	25
2	Classification of second ordered partial differential equations and canonical form. Non-linear second order partial differential equations: solution by Monge's method, special case and general case.	18	25
3	Second order partial differential equations with variable coefficients, method of changing variables for special type of equations. Separation of variable Method: solution of three special equations –Laplace, Wave and diffusion equation, Solution of these equations in different coordinate systems.	18	25
4	Boundary value problems: Dirichlet boundary value problems, Neumann boundary value problems, Maximum and minimum principles.	18	25

Course Outcome:

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

- At the end student will be able to use special function for solving real-life problems
- Construct meaningful connections between mathematics and other disciplines
- Model some physical cases as PDE and obtain their solution.

List of References:

- Amarnath, T., Elementary Course in Partial Differential Equations, Narosa Publ. House, New Delhi, 1997.
- Sneddon, I. N., Elements of Partial Differential Equations, McGraw- Hill Publ. Co., 1957.
- Grewal, B. S. and Grewal, J. S., Higher Engineering Mathematics, (36th Edition), Khanna Publ., New Delhi, 2000.
- Raisinghania, M. D. Advanced Differential Equations, S. Chand & Co., 1995.
- Phoolan Prasad and Ravindran, R., Partial Differential Equations, Wiley Eastern.