SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2021-2022

(Master of Science) (Mathematics)
(M.Sc.) (Mathematics) Semester (II)

Course Code	PS02CMTH55	Title of the Course	Methods of Partial Differential Equations
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	The aim of this course is to make students familiar with partial differential equations and various methods of solution.

Course Content		
Unit	Description	Weightage* (%)
1.	Origin of first order partial differential equation, solution of first order partial differential equation using Lagrange's method, non-linear first order partial differential equations: compatible system of first order partial differential equations, solution by Charpit's method and Jacobi's method.	25
2.	Origin of second order partial differential equations, linear second order partial differential equations with constant coefficients, solutions for F(D, D')z=f(x, y) to be polynomial, exponential, sin/cos functions, general method for homogeneous equations.	25
3.	Second order partial differential equations with variable coefficients, solution by method of changing variables u = logx, v = logy for special type of equations, Separation of variable method: solution of three special equations – Laplace, wave and diffusion equation, solution of these equations in cartesian and polar coordinate systems.	25
4.	Second order partial differential equations with variable coefficients, solution by method of changing variables u = logx, v = logy for special type of equations, Separation of variable method: solution of three special equations – Laplace, wave and diffusion equation, solution of these equations in cartesian and polar coordinate systems.	25

Teaching-Learning Methodology	Classroom teaching and learning

Evaluation Pattern		
Sr.	Details of the Evaluation	Weightage

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No.		
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	classify the partial differential equations its formation.
2.	find solution of linear and non-linear first order PDE.
3.	classify the second order partial differential equations, solution by Charpit's method and Jacobi's method
4.	elaborate solution of heat, wave and Laplace equation.

Suggested References:	
Sr. No.	References
1.	Sneddon I. N., Elements of Partial Differential Equations, McGraw- Hill Pub. Co., 1957
2.	Amarnath T., Elementary Course in Partial Differential Equations, Narosa Pub. House, New Delhi, 1997.
3.	Grewal B. S. and Grewal, J. S., Higher Engineering Mathematics, Khanna Pub., New Delhi, 2000.
4.	Raisinghania M. D., Advanced Differential Equations, S. Chand & Co., 1995.

On-line resources to be used if available as reference material
On-line Resources

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