

MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC Autonomous Institution)

Course Code	Course Title				Core/Elective	
25BS214MT	PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX VARIABLES Branch: B.E. (CIVIL)				Core	
Prerequisite	Contact hours per week				CIE	SEE
MDC, DENM	L	T	D	P		
	3	0	0	0	40	60
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Course Objectives: To learn

1. Understand Lagrange's equation and Charpit's method.
2. Perform Fourier series for a given range.
3. Understand wave equation, one-dimensional heat equation.
4. Understand Limit, Continuity and Analyticity of complex variables.
5. Apply Cauchy's theorem and Cauchy's integral formula.

Course Outcomes: After learning the contents of this course, the student must be able to

1. Formation of Partial Differential Equations.
2. Obtain the Fourier series for a given function.
3. Determine the solution of a PDE by the method of separation of variables.
4. Examine analyticity in Cartesian and Polar forms.
5. Evaluate contour integrals of functions of complex variables.

Unit-I: Partial Differential Equations: Formation of Partial Differential Equation, First order Partial Differential Equation, Solution of first order linear Partial Differential Equation, Lagrange's equation, Non-linear first order Partial Differential Equation, Charpit's method.

Unit-II: Fourier Series: Even and Odd functions, Dirichlet's conditions, Expansion of a function for a given range $(0, 2\pi)$, $(-\pi, \pi)$, $(0, 2l)$, $(-l, l)$. Half-range Sine and Cosine expansions.

Unit-III: Applications of Partial Differential Equations: Second order linear Partial Differential Equation and their classification, Method of separation of variables, vibrations of stretched string wave equation, one-dimensional heat equation.

Unit-IV: Complex Variables: Limit, Continuity of a function, Analytic function, Cauchy – Riemann Equations (Both Cartesian and Polar forms), Harmonic function.

Unit-V: Complex integration: Cauchy's theorem, Cauchy's integral formula, Taylor's series, Laurent's series.



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Suggested Reading:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publication 43rd Edition, 2014.
2. R. K Jain, S.R.K Iyengar, Advanced Engineering Mathematics, Narosa Publication. 4th Edition, 2014.
3. M.D.Rai Singhanian, Ordinary and Partial Differential Equations, S.Chand and Co., 2024, 20th Edition.

revised
25/7/26

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