

**Name of the faculty : Dr. Reena Garg**

**Class/Discipline : M.Sc. (Mathematics) III sem**

**Subject: Partial Differential Equations**

**Lecture Plan Duration : 12 weeks ( July 2025 - Dec.2025)**

**Work load Lecture: 04/week**

<b>Week</b>	<b>Theory</b>	
	<b>Lecture Day</b>	<b>Topic</b>
<b>I</b>	<b>I</b>	Method of Separation of variables to solve B.V.P. associated with one dimensional heat equation
	<b>II</b>	Continue.....
	<b>III</b>	Heat equation in semi-infinite regions.
	<b>IV</b>	Heat equation in infinite regions.
<b>II</b>	<b>I</b>	Continue.....
	<b>II</b>	Solution of three dimensional Laplace equation in Cartesian coordinates
	<b>III</b>	Solution of three dimensional Laplace equation in Cylindrical coordinates
	<b>IV</b>	Continue.....
<b>III</b>	<b>I</b>	Solution of three dimensional Laplace equation in Spherical coordinates
	<b>II</b>	Continue.....
	<b>III</b>	Solution of Wave equation in two dimensional
	<b>IV</b>	Continue.....
<b>IV</b>	<b>I</b>	Solution of wave equation in three dimensional (Cartesian , Cylindrical, Spherical)
	<b>II</b>	Continue.....
	<b>III</b>	PDE OF k th Order : Definition, examples and classifications
	<b>IV</b>	Continue.....
<b>V</b>	<b>I</b>	Initial value problems, Transport equations: definition
	<b>II</b>	Continue.....
	<b>III</b>	Solution of homogeneous transport equations
	<b>IV</b>	Solution of non-homogeneous transport equations

<b>VI</b>	<b>I</b>	Continue.....
	<b>II</b>	Laplace Equation, Fundamental solution of Laplace equation
	<b>III</b>	Continue.....
	<b>IV</b>	Harmonic function , Mean Value formula for Harmonic function
<b>VII</b>	<b>I</b>	Continue.....
	<b>II</b>	Green's formula, Corrector function (definition only)
	<b>III</b>	Green's function and its derivation
	<b>IV</b>	Continue.....
<b>VIII</b>	<b>I</b>	Representation formula using Green's function, Symmetry of Green's function
	<b>II</b>	Continue.....
	<b>III</b>	Energy methods : uniqueness, Dirichlet Principle
	<b>IV</b>	Continue.....
<b>IX</b>	<b>I</b>	Heat Equations : Fundamental solution of Heat equation
	<b>II</b>	Continue.....
	<b>III</b>	Uniqueness of Heat equation :Energy methods
	<b>IV</b>	Continue.....
<b>X</b>	<b>I</b>	Wave equation – Physical interpretation
	<b>II</b>	Solution for one dimensional wave equation, Reflection method
	<b>III</b>	Continue.....
	<b>IV</b>	derivation of Euler-Poisson Darboux equation
<b>XI</b>	<b>I</b>	Continue.....
	<b>II</b>	Kirchhoff's and Poisson's formulas (for n=2,3 only)
	<b>III</b>	Continue.....
	<b>IV</b>	Continue.....
<b>XII</b>	<b>I</b>	Solution of non-homogeneous wave equation for n=1,3
	<b>II</b>	Continue.....
	<b>III</b>	Energy method: Uniqueness of solution
	<b>IV</b>	Continue.....

**Two weeks are for sessionals.**

**Total 14 weeks.**

**Name of the Teacher: Dr. Reena Garg**

**Class/Discipline: B.Tech(ECE/ENC) 1<sup>st</sup> semester**

**Subject: Calculus and Linear Algebra(BSC-103D)**

**Lecture Plan Duration: 12 weeks(July,2025-Dec, 2025)**

**Work load :4L/week**

<b>Week</b>	<b>Theory</b>	
	<b>Lecture Day</b>	<b>Topic</b>
<b>I</b>	<b>I</b>	Evolutes and involutes
	<b>II</b>	Evaluation of definite and improper integrals
	<b>III</b>	Continue.....
	<b>IV</b>	Beta and Gamma functions and their properties;
<b>II</b>	<b>I</b>	Questions based on it
	<b>II</b>	Applications of definite integrals to evaluate surface areas and volumes of revolutions
	<b>III</b>	Continue.....
	<b>IV</b>	Rolle's Theorem
<b>III</b>	<b>I</b>	Mean value theorems
	<b>II</b>	Taylor's and Maclaurin theorems with remainders
	<b>III</b>	Continue.....
	<b>IV</b>	Indeterminate forms and L'Hospital's rule
<b>IV</b>	<b>I</b>	Maxima and minima
	<b>II</b>	Questions based on it
	<b>III</b>	Continue.....
	<b>IV</b>	Convergence of sequence and series
<b>V</b>	<b>I</b>	tests for convergence
	<b>II</b>	Power series
	<b>III</b>	Taylor's series
	<b>IV</b>	series for exponential
<b>VI</b>	<b>I</b>	trigonometric and logarithm functions
	<b>II</b>	Fourier series: Half range sine and cosine series,
	<b>III</b>	Questions based on it
	<b>IV</b>	Parseval's theorem
<b>VII</b>	<b>I</b>	Limit, continuity and partial derivatives,
	<b>II</b>	Continue.....
	<b>III</b>	directional derivatives, total derivative

	<b>IV</b>	Questions based on it
<b>VIII</b>	<b>I</b>	Tangent plane and normal line;
	<b>II</b>	Questions based on it
	<b>III</b>	Maxima, minima for two variables
	<b>IV</b>	Saddle points
<b>IX</b>	<b>I</b>	Method of Lagrange multipliers
	<b>II</b>	Continue.....
	<b>III</b>	Gradient, curl
	<b>IV</b>	Divergence
<b>X</b>	<b>I</b>	Inverse and rank of a matrix
	<b>II</b>	Continue.....
	<b>III</b>	rank-nullity theorem
	<b>IV</b>	Continue.....
<b>XI</b>	<b>I</b>	System of linear equations
	<b>II</b>	Symmetric, skew- symmetric
	<b>III</b>	Continue.....
	<b>IV</b>	orthogonal matrices
<b>XII</b>	<b>I</b>	Determinants ,Orthogonal transformation
	<b>II</b>	Eigenvalues and eigenvectors
	<b>III</b>	Diagonalization of matrices
	<b>IV</b>	Cayley-Hamilton Theorem

**Two weeks are for sessionals.**

**Total 14 weeks.**