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Study Plan of Mathematical Methods of Physics for Pre-recorded Batches

(For NET-JRF, GATE, JEST, TIFR Aspirant and M.Sc Students)

Days	Enter Your Dates	Topics Name
		Topic - 01. Mathematical Methods of Physics
		1. Vector Analysis
Day 1		Lecture 1: Introduction and cartesian coordinate system (Mathematical Methods)
		Lecture 2: Spherical Polar and Cylindrical coordinate system (Mathematical Methods)
Day 2		Lecture 3: Transformation of vectors from one system to other (Mathematical Methods)
		Lecture 4: Gradient and its Applications (Mathematical Methods)
Day 3		Lecture 5: Divergence and curl (Mathematical Methods)
		Lecture 6: Introduction to line, surface & volume integrals (Mathematical Methods)
Day 4		Lecture 7: Fundamental Theorem of Divergence (Mathematical Methods)
		Lecture 8: Fundamental Theorem of curl (Mathematical Methods)
Day 5		Lecture 9: Miscellaneous Example on Fundamental Theorems (Mathematical Methods)
		Lecture 10: Green's Theorem (Mathematical Methods)
		Class Test 1: Vector Analysis (Mathematical Methods of Physics)
		2. Dirac Delta Function
Day 6		Lecture 1: One dimensional Dirac Delta Function - Part - 1 (Mathematical Methods)
		Lecture 2: One dimensional Dirac Delta Function - Part - 2 (Mathematical Methods)
Day 7		Lecture 3: Two and Three dimensional Dirac Delta Function (Mathematical Methods)
		Class Test 2: Dirac Delta Function (Mathematical Methods of Physics)
		3. Odinary Differential Equations
Day 8		Lecture 1: Introduction, Separable and Homogeneous Differential Equation (Mathematical Methods)
		Lecture 2: Exact Differential Equation (Mathematical Methods)
Day 9		Lecture 3: Linear Differential Equation Ist Order (Mathematical Methods)
		Lecture 4: Linear Homogeneous D.E. of Second Order - 1st Part (Mathematical Methods)
Day 10		Lecture 5: Linear Homogeneous D.E. of Second Order - 2nd Part (Mathematical Methods)
		Lecture 6: Linear Non-homogeneous D.E.of Second Order (Mathematical Methods)
		Class Test 3: Differential Equations (Mathematical Methods of Physics)
		4. Fourier Series
Day 11		Lecture 1: Introduction of Fourier Series and Euler's Formula (Mathematical Methods)
		Lecture 2: Examples of Fourier Series of period 2 pie (Mathematical Methods)
Day 12		Lecture 3: Fourier Series of any period 2 L (Mathematical Methods)
		Lecture 4: Fourier Series of Even and Odd Functions (Mathematical Methods)
Day 13		Lecture 5: Complex Fourier Series (Mathematical Methods)
		Lecture 6: Approximation of functions by Trigonometric Polynomials (Mathematical Methods)
		Class Test 4: Fourier Series (Mathematical Methods of Physics)
		5. Matrices
Day 14		Lecture 1: Basic concepts of Matrices (Mathematical Methods)
		Lecture 2: Special Matrices Properties (Mathematical Methods)
Day 15		Lecture 3: Linear System of equations (Mathematical Methods)
		Lecture 4: Linear Independence of Vectors and Rank of a Matrix (Mathematical Methods)
Day 16		Lecture 5: Determinant and Inverse of a Matrix (Mathematical Methods)
		Lecture 6: Matrix Operator and Linear Transformation (Mathematical Methods)
Day 17		Lecture 7: Eigenvalues and Eigenvector, Diagonalisation (Mathematical Methods)
		Lecture 8: Problems on Eigenvalue, Eigenvector, Diagonalisation (Mathematical Methods)
Day 18		Lecture 9: Functions of Matrices (Mathematical Methods)
		Lecture 10: Group Theory (Mathematical Methods)
		Class Test 5: Linear Algebra Matrices (Mathematical Methods of Physics)
		6. Complex Analysis
Day 19		Lecture 1: Complex Numbers (Mathematical Methods)
		Lecture 2: Polar Form of Complex Numbers (Mathematical Methods)
Day 20		Lecture 3: Complex Function and their Derivative (Mathematical Methods)
		Lecture 4: Anaytic Function, C-R Equations (Mathematical Methods)
Day 21		Lecture 5: Special Complex Functions (Mathematical Methods)
		Lecture 6: Cauchy's Integral Theorem (Mathematical Methods)
Day 22		Lecture 7: Cauchy's Integral Formula (Mathematical Methods)
		Lecture 8: Taylor and Laurent Expansion of Complex Functions (Mathematical Methods)
Day 23		Lecture 9: Zeros and Singularities (Mathematical Methods)
		Lecture 10: Calculus of Residues (Mathematical Methods)
Day 24		Lecture 11: Evaluation of definite Integrals Part - 1 (Mathematical Methods)
		Lecture 12: Evaluation of definite Integral Part - 2 (Mathematical Methods)
Day 25		Lecture 13: Branch Point Singularity (Mathematical Methods)
		Class Test 6: Complex Number and Functions (Mathematical Methods of Physics)
		Class Test 7: Complex Integration/Contour Integration (Mathematical Methods of Physics)
		7. Laplace Transform
Day 26		Lecture 1: Laplace and Inverse Laplace Transform (Mathematical Methods)
		Lecture 2: Laplace Transform of Derivatives and Integrals (Mathematical Methods)
Day 27		Lecture 3: Second Shifting Theorem (Mathematical Methods)
		Lecture 4: Other Properties of Laplace Transform (Mathematical Methods)
		8. Fourier Transform
Day 28		Lecture 1: Fourier Transform Part - 1 (Mathematical Methods)
		Lecture 2: Fourier Transform Part - 2 (Mathematical Methods)
Day 29		Lecture 3: Fourier Transform Part - 3 (Mathematical Methods)
		Lecture 4: Fourier Transform Part - 4 (Mathematical Methods)
		Class Test 8: Fourier Transform and Laplace Transform (Mathematical Methods of Physics)
		9. Special Function
Day 30		Lecture 1: Legendre Function (Mathematical Methods)
		Lecture 2: Hermite and Laguerre Function (Mathematical Methods)
Day 31		Lecture 3: Bessel Function and Singular Point of Differential Equation (Mathematical Methods)
		Class Test 9: Special functions-Hermite, Bessel, Laguerre and Legendre functions (Mathematical Methods of Physics)
		10. Greens Function
Day 32		Lecture 1: Greens Function (Mathematical Methods)
		Lecture 2: Greens Function (Mathematical Methods)
		11. Partial Differential Equation (PDE)
Day 33		Lecture-1 PDE Introduction
		Lecture-2 1D Wave Equation (Solution)
Day 34		Lecture-3 1D Heat equation (Solution)
		Lecture-4 2D Heat Equation in Steady State
		Class Test 10: Greens function and Partial Differential Equation (Mathematical Methods of Physics)
		12. Numerical Technique
Day 35		Lecture 1 (M P: Numerical Techniques) Error Analysis in Numerical Methods
		Lecture 2 (M P: Numerical Techniques) Error in Numerical Methods
Day 36		Lecture 3 (M P: Numerical Techniques) Error Propagation
		Lecture 4 (M P: Numerical Techniques) Significant Figures
Day 37		Lecture 5 (M P: Numerical Techniques) Methods of Last Square Fihing
		Lecture 6 (M P: Numerical Techniques) Numerical Methods
Day 38		Lecture 7 (M P: Numerical Methods) Newton Backward Difference Interpolation Formula
		Lecture 8 (M P: Numerical Methods) Lagrange Interpolation Formula
Day 39		Lecture 9 (M P: Numerical Methods) Lagrange Interpolation Formula
		Lectue 10 Numerical Methods (Solution of Algebraic Equation)
		Class Test 11: Numerical Techniques (Mathematical Methods of Physics)

		13. Calculus of Single and Multiple Variable
Day 40		Lecture-1: Limits (Mathematical Methods)
		Lecture-2: Continuity and Differentiability (Mathematical Methods)
Day 41		Lecture-3: Tangent and Normal, Maxima and Minima (Mathematical Methods)
		Lecture-4: Properties of Partial Differentials (Mathematical Methods)
Day 42		Lecture-5: Jacobians (Mathematical Methods)
		Lecture-6: Taylor Series of Function of One and Two Variables (Mathematical Methods)
Day 43		Lecture-7 Multiple Integral Part-1 (Mathematical Methods)
		Lecture-8: Multiple Integral Part-2 (Mathematical Methods)
		Class Test 12: Calculus of Single and Multiple Variable (Basic Calculus) (Mathematical Methods of Physics)
		14. Probability
Day 44		Lecture 1: Probability Distribution (Mathematical Methods)
		Lecture 2: Probability Distribution (Mathematical Methods)
Day 45		Lecture 3: Probability Distribution (Mathematical Methods)
		Lecture 4: Probability Distribution (Mathematical Methods)
Day 46		Lecture 5: Probability Distribution (Mathematical Methods)
		Lecture 6: Probability Distribution (Mathematical Methods)
Day 47		Lecture 7: Probability Distribution (Mathematical Methods)
		Lecture 8: Probability Distribution (Mathematical Methods)
Day 48		Lecture 9: Probability Distribution (Mathematical Methods)
		Lecture 10: Probability Distribution (Mathematical Methods)
Day 49		Lecture 11: Probability Distribution (Mathematical Methods)
		Lecture 12: Probability Distribution (Mathematical Methods)
Day 50		Lecture 13: Probability Distribution (Mathematical Methods)
		Lecture 14: Probability Distribution (Mathematical Methods)