LESSON PLAN

Name of Assistant Professor: Dr. Vandana Gupta
Subject: Mathematics
Even Semester (2022-2023)

Class	B.A/B.Sc II Semester	B.A/B.Sc IV Semester(Practical) Group-A, B	B.A/B.Sc VI Semester	B.A/B.Sc IV Semester(Theory)
Subject	Ordinary Differential Equation, Number theory and trigonometry	Programming in C & Numerical Methods	Linear Algebra, Dynamics	Special functions and integral transforms/Programming in C & numerical methods
FEBRUARY	Differential Equations, Exact Differential Equations, Integrating factor, Integrating factor by inspection method	Program to generate first n prime numbers (Group-A)	Describe Vector space & its properties, Example of vector space	Series solution of differential equations – Power series method
	Rule-1,2,3 to find Integrating factor and examples based on it	Program to solve quadratic equation (Group-A)	Subspace, Linear Sum of Subspace & Subspace Generated by Set	Definitions of Beta and Gamma functions.
	Rule-4,5 to find Integrating factor and examples based on it	Revision(Group-A)	Vector space & its properties, Example	Bessel equation and its solution: Bessel functions and their properties, Convergence, recurrence
	Revision of the topic	Program to generate first n prime numbers(Group-B)	Subspace, Linear Sum of Subspace & Subspace Generated by Set	Relations and generating functions

		Program to solve quadratic equation(Group-B)	Direct Sum of Subpace & Disadjoint Subspace	Orthogonality of Bessel functions
	Test			
	Equations solvable for p, working rule and examples based on it	Revision(Group-B)	Linear Combination of Vectors L.D &L.I, Related Theorems	Legendre and Hermite differentials equations and their solutions
	Equations solvable for y, working rule and examples based on it	Program to calculate compound interest(Group-A)	Linear Combination of Vectors L.D &L.I, Related Theorems	Legendre and their properties
	Equations solvable for x working rule and examples based on it	Program to compute the value of π(Group-A)	Spanning Set & Linear span , Fintely Generated Vector	Revision
	Lagrange's Equation, working rule and examples based on it	Revision(Group-A)	Basis of a Vector Space , Ordered Basis	Hermite functions
	Revision of the topic	Program to calculate compound interest(Group-B)	Spanning Set & Linear span , Finitely Generated Vector	Propertiesof Hermite functions
	Test	Program to compute the value of π(Group-B)	Basis of a Vector Space , Ordered Basis Existence theorem	Revision
	Clairaut's equation, Equations reducible to Clairaut'sform	Revision(Group-B)	Invariance of the number of elements of basis, Maximal linearly Independent set	Revision
	Singular solution, Discriminant, p-	Program to swap two numbers(Group-A)	Invariance of the number of	Test

	discriminant, c-discriminant		elements of basis	
	Related examples and revision of the topic	Program to count number of vowels and consonants (Group-A)	Maximal linearly Independent set , Minimal Generating set & Related thms	Recurrence Relations
	Test	Revision(Group-A)	Dimension of a vector space , Extension theorems	Generating functions
	Trajectory and types of trajectory with examples	Program to swap two numbers(Group-B)	Indentical Spaces & Examples	Revision
	Orthogonal trajectory in cartesian co-ordinates and examples based on it	Program to count number of vowels and consonants (Group-B)	Dimension of a vector space , Extension theorems	Revision
	Orthogonal trajectory in polar co-ordinates and examples based on it	Revision(Group-B)	Dimension of linear & Direct Sum	Test
MARCH	Revision of the topic	Program for pattern matching for two strings(Group-A)	Complementary Subspace and examples, Quotient Space, Quotient Space	Orhogonality of Legendre polynomials.
	Test	Program for pattern matching for two strings(Group-B)	Describe linear transformation or V.S Homomorphism	-do-
	Linear Differential Equations with constant co-efficients, the	Revision(Group-B)	Properties & Example of L.T.	-do-

	Differential operator D, Complete solution of L.D. Equations			
	Auxiliary equation (A.E.), To find the complete solution of Differential Equations	Program to reverse a string(Group-A)	One-One L.T. & Onto L.T., Construction of L.T.	Orhogonality of Hermite polynomials.
	Rules to solve an equation and its examples	Program to illustrate encryption and decryption of string(Group-A)	Null Space, Range or Image of L.T., Fundamental Theorem of vector space homomorphism	-do-
	Test	Program to reverse a string(Group-B)	Examples of kernel & Range Space, Composition of two L.T.	-do-
	Complementary function and particular integral Rule to solve equations involving 1/f(d) and examples using the rule	Program to illustrate encryption and decryption of string(Group-B)	Singular & Non Singular Transformation, Invertible L.T.	Rodrigues' Formula for Legendre & Hermite Polynomials
	Rule to solve Differential Equations involving exponential	Revision(Group-B)	Matrix of L.T. , coordinate Vector	-do-
	Examples related to the above rule	Program to find G.C.D. of two numbers(Group-A)	Matrix of Identity & Zero Transformation	-do-
	Revision	Cont...(Group-A)	Change of Basis & Related theorems	Laplace Integral Representation of

				Legendre polynomial.
	Test	Revision(Group-A)	Dual Space, Double dual of Vector Space	-do-
	Differential Equations involving trigonometric functions and examples based on it	Program to find G.C.D. of two numbers(Group-B)	Eigen values & Eigen Vector of L.T.	Laplace Transforms – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems, Laplace transforms of derivatives and integrals
	case of failure and examples based on it	Cont…(Group-B)	Matrix of Identity & Zero Transformation	-do-
	Differential Equations involving algebraic functions and examples based on it	Program to generate first n Fibonacci terms(Group-A)	Similar Matrix , Diagonalisation, Minimal Polynomial,	-do-
	Differential Equations involving product of functions and examples based on it	Cont…(Group-A)	Inner Product space & Examples , Norm of Vector & Theorems	Differentiation and integration of Laplace transforms, Convolution theorem
	Homogeneous linear equation and method of solving	Program to generate first n Fibonacci terms(Group-B)	Eigen values & Eigen Vector of L.T., Similar Matrix , Diagonalisation, Minimal Polynomial	-do-
APRIL	Equations reducible to Homogeneous linear form and examples based on it	Cont…(Group-B)	Cauchy Schwarz Inequality, Triangle Inequality	-do-
	Solve linear Differential	Revision(Group-B)	Normed linear Space ,	Inverse Laplace transforms, convolution

	Equation of 2nd order by changing the dependent variable when an integral included in C. F.is known and examples based on it		Orthogonal Vector & Complement, Orthonormal Set	theorem, Inverse Laplace transforms of derivatives and integrals
	Method of finding P. I. and examples based on it	Program to find transpose of matrix(Group-A)	Inner Product space & Examples , Norm of Vector & Theorems	-do-
	To solve linear Differential Equation of 2nd order by removing the first derivative and changing the dependent variable and working rule	Program for multiplications of matrix(Group-A)	Gram Schmidt orthogonalization Process	Solution of ordinary differential equations using Laplace transform
	To solve linear Differential Equation of 2nd order by changing the independent variable and working rule	Revision(Group-A)	Bessel's Inquality, Adjoint Operator & Self Adjoint Operator	-do-
	To solve linear Differential Equation of 2nd order by the method of variation of parameters and working rule and examples based on it	Program to find transpose of matrix(Group-B)	Motion on smooth and rough plane curves	-do-

To solve linear Differential Equation of 2nd order by the method of undetermined coefficients, table related to the topic	Program for multiplications of matrix(Group-B)	Cont…	Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem
Revision	Revision(Group-B)	Cont…	-do-
1st Method of solving Simultaneous linear Differential Equations with constant coefficients and examples based on it	Program to generate first n Fibonacci terms(Group-A)	Projectile motion of a particle in a plane	-do-
2nd Method: Method of Differentiation and examples based on it	Cont…(Group-A)	Cont…	Test
Simultaneous Equations of the form P1dx+ Q1dy+R1dz=0 and P2dx+Q2 dy+ R2dz=0 where P1, P2,…..are functions of z and examples based on it	Program to demonstrate Bisection method(Group-A)	Vector angular velocity	Parseval's identity for Fourier transforms
Method for solving dx/P= dy/Q= dz/R and examples based on it and general interpretation	Cont…(Group-A)	Cont…	-do-
Second integral found with the help of first and	Revision(Group-A)	Cont…	-do-

	examples based on it			
	Discussion of the above topic	Program to generate first n Fibonacci terms(Group-B)	Doubt Session.	-do-
	Test	Program to demonstrate Bisection method(Group-B)	Doubt Session.	-do-
	Total Differential Equations, Necessary and sufficient condition for the integrability condition of exactness	Revision(Group-B)	Test	Solution of differential Equations using Fourier Transforms
	Method1-Inspection method and related examples	Program to demonstrate Regula- Falsi method(Group-A)	General motion of a rigid body	-do-
	Method 2: Regarding one variable as constant out of three variables in Pdx+Qdy+Rdz=0 and related examples	Cont...(Group-A)	Cont...	-do-
	Method3 of solving Homogeneous Equations and examples based on it	Revision(Group-A)	Cont...	Programmer's model of a computer, Algorithms, Flow charts
	Method 4: Method of Auxiliary equation and examples based	Program to demonstrate Regula- Falsi method(Group-B)	Cont...	-do-

	on it			
	Examples related to the above topic	Cont…(Group-B)	Cont…	-do-
	Test	Revision(Group-B)	Cont…	-do-
	To solve the total Differential Equation when it is exact and homogenous of degree n not equal to –1 and examples based on it	Program to demonstrate Newton-Raphson method(Group-A)	Central Orbits	Data types, Operators and expressions
	Continue	Cont…(Group-A)	Cont…	-do-
	Revision of the topic	Revision(Group-A)	Cont…	-do-
	Test	Program to demonstrate Newton-Raphson method(Group-B)	Cont…	
	Discussion on the problems of the students	Revision(Group-B)	Cont…	-do-
MAY	De moivre's theorem	Program to demonstrate Gauss Elimination method(Group-A)	Kepler laws of motion	Decisions control structure
	Roots of a Complex number	Cont…(Group-A)	Cont…	-do-
	Solutions of equations, Expansion, Exponential functions of a complex variables	Revision(Group-A)	Cont…	Decision statements
	Revision of the topic	Program to demonstrate Gauss Elimination	Cont…	-do

		method(Group-B)		
	Test	Cont...(Group-B)	Cont...	-do-
	Properties of exponential function, Circular functions of complex variables	Program to demonstrate Gauss Seidel method(Group-A)	Motion of a particle in three dimensions	Test
	Euler's theorem, Trigonometrical formulae for complex quantities, Numerical problem's of Trigonometric	Cont...(Group-A)	Cont...	Logical statements
	Hyperbolic functions, Logarithm of a complex quantity	Revision(Group-A)	Cont...	-do-
	General exponential function, General logarithmic function	Program to demonstrate Gauss Seidel method(Group-B)	Cont...	conditional statements
	Revision	Cont...(Group-B)	Revision	-do-
	Test	Revision(Group-B)	Test	-do-
	Inverse circular functions of a real variable	Program to demonstrate Gauss Jordan method(Group-A)	Acceleration in terms of different co-ordinate systems	Implementation of Loops, Switch Statement &
	General values and principal value	Cont...(Group-A)	Cont...	-do-
	Identities of inverse circular function	Revision(Group-A)	Cont...	-do-
	Revision	Program to	Cont...	-do-

		demonstrate Gauss Jordan method(Group-B)		
	Test	Cont…(Group-B)	Cont…	Case control structures
	Numerical of inverse circular function	Program to demonstrate Crout's method(Group-A)	Doubt Session	-do-
	Inverse circular functions of a complex number	Cont…(Group-A)	Doubt Session	-do-
	Inverse hyperbolic functions, Relation between inverse circular function and inverse hyperbolic functions	Program to demonstrate Crout's method(Group-B)	Doubt Session	-do-
	Revision	Cont…(Group-B)	Revision	Functions
	Test	Revision(Group-B)	Revision	-do-
	Gregory's series and its numerical	Revision of practicals and problem discussed(Group-A)	Revision	-do
	Series of sines and cosines of angle which are in A.P, Method of differences	Cont…(Group-A)	Revision	-do-
	C+iS method of summation	Revision(Group-A)	Revision	Preprocessors and Arrays
	Series depending on logarithmic series, Summation of	Revision of practicals and problem discussed(Group-B)	Revision	-do-

	series			
	Revision of the topic discussed	Cont…(Group-B)	Test	-do-
	Test	Revision(Group-B)	Test	Revision