### LESSON PLAN FOR SESSION 2021-22

Subject Name: Linear Algebra

Subject code: 12BSM 362

Class : B.Sc. (Non-Medical), Sem-VI

**Teacher Name:-ANURADHA SABHARWAL** 

MONTH	ΤΟΡΙΟ
MARCH	Vector spaces, subspaces, Sum and Direct sum of subspaces,
APRIL	Linear span, Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vactor space, Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension. Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vactor spaces, Vactor space of all the linear transformations Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimentional vactor spaces, Null Space, Range space of a linear transformation, Rank and Nullity Theorem,
ΜΑΥ	Algebra of Liner Transformation, Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, Matrix of a linear Transformation, Change of basis, Eigen values and Eigen vectors of linear transformations.
JUNE	Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis, Bessel's inequality for finite dimensional vector spaces, Gram- Schmidt, Orthogonalization process, Adjoint of a linear transformation and its properties, Unitary linear transformations.

### LESSON PLAN FOR SESSION 2021-22

### Subject Name: Linear Algebra

Subject code: 12BAM 362

Class : B.A. (Maths), Sem-VI

**Teacher Name:-ANURADHA SABHARWAL** 

MONTH	ΤΟΡΙϹ
MARCH	Vector spaces, subspaces, Sum and Direct sum of subspaces,
APRIL	Linear span, Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vactor space, Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension. Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vactor spaces, Vactor space of all the linear transformations Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimentional vactor spaces, Null Space, Range space of a linear transformation, Rank and Nullity Theorem,
ΜΑΥ	Algebra of Liner Transformation, Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, Matrix of a linear Transformation, Change of basis, Eigen values and Eigen vectors of linear transformations.
JUNE	Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis, Bessel's inequality for finite dimensional vector spaces, Gram- Schmidt, Orthogonalization process, Adjoint of a linear transformation and its properties, Unitary linear transformations.

### LESSON PLAN FOR SESSION 2021-22

# Subject Name with code and semester:-MATH (DYNAMICS), 12BSM 353, B.Sc. SEMESTER- 6

Teacher Name:-SHILPA GOYAL

MONTH	ΤΟΡΙΟ
MARCH	Velocity and acceleration along radial, transverse.
APRIL	Velocity and acceleration along tangential and normal directions. Relative velocity and acceleration. Simple harmonic motion. Elastic strings. Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy. Definitions of Conservative forces and Impulsive forces.
ΜΑΥ	Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.
JUNE	General motion of a rigid body. Central Orbits, Kepler laws of motion. Motion of a particle in three dimensions. Acceleration in terms of different co-ordinate systems.

### LESSON PLAN FOR SESSION 2021-22

Subject Name with code and semester:-MATH (DYNAMICS), 12BSM 353, B.A. SEMESTER- 6

Teacher Name:-SHILPA GOYAL

MONTH	TOPIC
MARCH	Velocity and acceleration along radial, transverse.
APRIL	Velocity and acceleration along tangential and normal directions. Relative velocity and acceleration. Simple harmonic motion. Elastic strings. Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy. Definitions of Conservative forces and Impulsive forces.
ΜΑΥ	Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.
JUNE	General motion of a rigid body. Central Orbits, Kepler laws of motion. Motion of a particle in three dimensions. Acceleration in terms of different co-ordinate systems.

### LESSON PLAN FOR SESSION 2021-22

# Subject Name with code and semester:-MATH (NUMBER THEORY AND TRIGONOMETRY) , 12BSM 12 , SEMESTER- 2

Teacher Name:-SHILPA GOYAL

MONTH	TOPIC
MARCH	Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple)
APRIL	Primes, Fundamental Theorem of Arithemetic. Linear Congruences, Fermat's theorem. Wilson's theorem and its converse. Linear Diophanatine equations in two variables Section – II : Complete residue system and reduced residue system modulo m. Euler's ø function Euler's generalization of Fermat's theorem. Chinese Remainder Theorem. Quadratic residues. Legendre symbols. Lemma of Gauss; Gauss reciprocity law. Greatest integer function [x]. The number of (n)). Moebius odivisors and the sum of divisors of a natural number n (The functions d(n) and function and Moebius inversion formula.
ΜΑΥ	De Moivre's Theorem and its Applications. Expansion of trigonometrical functions. Direct circular and hyperbolic functions and their properties.
JUNE	Inverse circular and hyperbolic functions and their properties. Logarithm of a complex quantity. Gregory's series. Summation of Trigonometry series.

### LESSON PLAN FOR SESSION 2021-22

Subject Name with code and semester:-MATH (Special Functions and Integral Transforms), 12BSM 242, B.Sc. SEMESTER- 4

**Teacher Name:-ANOOP KUMAR** 

MONTH	TOPIC
MARCH	Series solution of differential equations – Power series method, Definitions of Beta and Gamma functions. Bessel equation and its solution: Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions
APRIL	Legendre and Hermite differentials equations and their solutions: Legendre and Hermite functions and their properties-Recurrence Relations and generating functions. Orhogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials, Laplace Integral Representation of Legendre polynomial.
ΜΑΥ	Laplace Transforms – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems, Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms, Convolution theorem, Inverse Laplace transforms, convolution theorem, Inverse Laplace transforms of derivatives and integrals, solution of ordinary differential equations using Laplace transform.
JUNE	Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem, Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform, Parseval's identity for Fourier transforms, solution of differential Equations using Fourier Transforms.

### LESSON PLAN FOR SESSION 2021-22

### Subject Name: NUMBER THEORY AND TRIGNOMETRY

Subject code: 12BSM 121

Class :B.A/ B.Sc. (Non-Medical), Sem-2nd

Teacher Name:-pinky

MONTH	ΤΟΡΙϹ
MARCH	Divisibility,G.C.D,L.C.M,Primes,Fundamental theorm of Arithmetic.
APRIL	Linear congruences, fermat's theorm, Wilson's theorm and its converse linear Diophantine equations in two variables. Complete residue system and reduced residue system modulo M. Euler function. Euler's generalization of fermat's theorem. Chinese reminders theorem, quadratic residues, legendre symbols, lemma of Gauss, Gauss Reciprocity law. Greatest integer function[x]. The number of divisors and the sum of divisors of a natural number n and Moebius function and Moebius inversion formula.
ΜΑΥ	De-Moivre's theorem and its application. Expansion of trigonometrical functions . Direct circular and hyperbolic functions and their properties.
JUNE	Inverse circular and hyperbolic functions and their properties. Logarithm of a complex quantity. Gregory's group series. Summation of trigonometric series.

### LESSON PLAN FOR SESSION 2021-22

### Subject Name: Sequence and Series

Subject code: 12BAM 241

Class : B.A./B.Sc (Maths), Sem-4th

Teacher Name:-pinky

MONTH	ΤΟΡΙΟ
MARCH	Boundedness of the set of real numbers, least upper bound, greatest lower bound of a set, nbd. , interior points, isolated points.
APRIL	Limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties. Sequence- Real sequences and their convergence, Theorems on limits of a sequence, Bounded and monotonic sequences, Cauchy's sequence, Cauchy's general principle of convergence, subsequences, subsequential limits.
ΜΑΥ	Infinite series- convergence and divergence of infinite series , comparison tests of positive terms infinite series. Cauchy's general principle, hyper-harmonic series or p-series. D'Alemberts ratio test, Raabe's test, logarithmic test , de-morgan and Bertrand tet, Cauchy's nth root test, Gauss test.
JUNE	Alternating series: Leibnitz's test, absolute and conditional convergence. Arbitrary series: Abe'sl lemma, abel's test, Dirichlet's test, insertion and removal of parenthesis, re-arrangment of terms in a series, Dirichlet's theorem, Riemann Re-arrangements theorem.

### LESSON PLAN FOR SESSION 2021-22

# Subject Name with code and semester:-MATH (Ordinary Differential Equations), BM 122 ,B.A. SEMESTER-2<sup>nd</sup>

### Teacher Name:-Mr. Rakesh Singh

MONTH	ΤΟΡΙϹ
MARCH	Geometrical meaning of a differential equation. Exact differential equations, integrating factors. First order higher degree equations solvable for x,y,p Lagrange's equations.
APRIL	Clairaut's equations. Equation reducible to Clairaut's form. Singular solutions. Orthogonal trajectories: in Cartesian coordinates and polar coordinates. Self orthogonal family of curves Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations. Equations reducible to homogeneous. Test.
ΜΑΥ	Linear differential equations of second order: Reduction to normal form. Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations. Reduction of order of a differential equation. Method of variations of parameters. Method of undetermined coefficients. Test.
JUNE	Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators x (d/dx) or t (d/dt) etc. Simultaneous equation of the form $dx/P = dy/Q = dz/R$ . Total differential equations. Condition for Pdx + Qdy +Rdz = 0 to be exact. General method of solving Pdx + Qdy + Rdz = 0 by taking one variable constant. Method of auxiliary equations

### LESSON PLAN FOR SESSION 2021-22

# Subject Name with code and semester:-MATH (Special Functions and Integral Transforms) , 12BSM 242 ,B.A. SEMESTER- 4<sup>th</sup>

### Teacher Name:-Mr. Rakesh Singh

MONTH	ΤΟΡΙϹ
MARCH	Series solution of differential equations – Power series method, Definitions of Beta and Gamma functions, Bessel equation and its solution.
APRIL	Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions. Legendre and Hermite differentials equations and their solutions: Legendre and Hermite functions and their properties-Recurrence Relations and generating functions. Orhogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials, Laplace Integral Representation of Legendre polynomial. Test.
ΜΑΥ	Laplace Transforms – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems, Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms, Convolution theorem, Inverse Laplace transforms, convolution theorem, Inverse Laplace transforms of derivatives and integrals, solution of ordinary differential equations using Laplace transform. Test.
JUNE	Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem, Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform, Parseval's identity for Fourier transforms, solution of differential Equations using Fourier Transforms.

#### LESSON PLAN FOR SESSION 2021-22

Subject Name with code and semester:- Mathematics (Programming in C and Numerical Methods) with Code:-Ma 02 (B.sc second year, 4th sem.)

**Teacher Name:-Sonia** 

MONTH	ТОРІС
March	General introduction of Computer,Algorithm,Flowcharts,Introduction to C variables,Data types,Programs
April	Operators and Expressions, Test, Decision of control structures, Loops, exercise, examples, Function, The C pre-processor, Macros, Arrays, Strings, structures and Unions
May	Assignment, Files in C, Solution of Algebraic and transcendental equations, Bisection method, Test, regula Falsi Method, Secant method, newton Raphson method, Exercise and examples
June	Simultaneous linear algebraic equations,Gauss Elimination Method,Gauss-jordan Method,LU decomposition method,square rppt method,Indirect methods,exercise,examples,test,Revision

### LESSON PLAN FOR SESSION 2021-22

# Subject Name with code and semester:- Mathematics (Vector Calculus)with code BM-123 (Bsc first year ,2<sup>nd</sup> sem.)

### Teacher Name:- Sonia

MONTH	ΤΟΡΙϹ
March	Review,Scalar and Vector product of three vectors,product of four vectors,Reciprocal Vectors,Vector differentiation
April	Scalar valued point Functions, derivative along a curve, directional derivatives, gradient, Geometrical interpretation of gradient, character of gradient, divergence and curl vector point function, examples, Gradient, Divergence and curl of sums and product and their related vector identities, Laplacian Operator, Orthogonal curvelinear co-ordinates.
May	Conditions for orthogonality,fundamental triad of mutually orthogonal unit vectors,gradient,divergence,curl and Laplacian operators in terms of orthogonal curve linear co-ordinates,Speherical co-ordinates test, Assignment
June	Vector integration,Line integral,Surface integral,Volume integral,Theorem of Gauss, Green, Stokes and problrems. Revision

### LESSON PLAN FOR SESSION 2021-22

Subject Name: Real and Complex Analysis

Subject code: 12BSM 361

Class : B.Sc. (Non-Medical), Sem-VI

Teacher Name:-Dr Mukesh Singh

MONTH	ΤΟΡΙΟ
MARCH	Jacobians, Beta and Gama functions, Double and Triple integrals.
APRIL	Double and Triple integrals, Dirichlets integrals, change of order of integration in double integrals. Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Coefficients, Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of Intervals
ΜΑΥ	Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions, Analytic functions, Cauchy- Riemann equations. Harmonic functions.
JUNE	Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed pints, Cross ratio, Inverse Points and critical mappings.

### GOVERNMENT COLLEGE BAHADURGARH

### LESSON PLAN FOR SESSION 2021-22

### Subject Name: Real and Complex Analysis

## Subject code: 12BAM 361

### Class : B.A. (Maths), Sem-VI

## Teacher Name:-Dr Mukesh Singh

MONTH	ΤΟΡΙϹ
MARCH	Jacobians, Beta and Gama functions, Double and Triple integrals.
APRIL	Double and Triple integrals, Dirichlets integrals, change of order of integration in double integrals. Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Coefficients, Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of Intervals
ΜΑΥ	Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions, Analytic functions, Cauchy- Riemann equations. Harmonic functions.
JUNE	Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed pints, Cross ratio, Inverse Points and critical mappings.