Summary of Lesson Plans of College Faculty

Name of College: Govt. College for Girls Taraori (Karnal) **Academic Session: 2021-22 Semester: Odd For the Month of Oct., 2021**

S.No.	Name	Class	Paper /Subject	Topics/Chapter to Be covered
1	Dr. Vinod Kumar Assistant Professor of Mathematics	**BA/B.Sc. First Semester**	Algebra	Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices. Elementary Operations on matrices. Rank of a matrices. Inverse of a matrix. Linear dependence and independence of rows and columns of matrices
			Calculus	Definition of the limit of a function. Basic properties of limits, Continuous functions and classification of discontinuities. Differentiability
			Solid Geometry	General equation of second degree. Tracing of conics. Tangent at any point to the conic, chord of contact, pole of line to the conic, director circle of conic.
		B.Sc. Third Semester	Advanced Calculus	Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chain rule of differentiability. Mean value theorems; Rolle's Theorem and Lagrange's mean value theorem and their geometrical interpretations.
			Partial Differential Equations	Partial differential equations: Formation, order and degree, Linear and Non-Linear Partial differential equations of the first order: Complete solution, singular solution,
			Statics	Composition and resolution of forces. Parallel forces
		B.Sc. Fifth Semester	REAL ANALYSIS	Riemann integral, Integrabililty of continuous and monotonic functions,
			Groups and Rings	Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups
			NUMERICAL ANALYSIS	Finite Differences operators and their relations. Finding the missing terms and effect of error in a difference tabular values, Interpolation with equal intervals: Newton's forward and Newton's backward interpolation formulae

Summary of Lesson Plans of College Faculty

Name of College: Govt. College for Girls Taraori (Karnal) **Academic Session: 2021-22 Semester: Odd For the Month of Nov., 2021**

S.No	Name	Class	Paper	Topics/Chapter to Be covered
2	Dr. Vinod Kumar Assista nt Profess or of Mathe matics	**BA/B.Sc.** First Semest er	Algebra	polynomial of a matrix. Cayley Hamilton theorem and its use in finding the inverse of a matrix. Applications of matrices to a system of linear (both homogeneous and non– homogeneous) equations. Theorems on consistency of a system of linear equations. Unitary and Orthogonal Matrices, Bilinear and Quadratic forms.
			Calculus	Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions. Asymptotes in Cartesian coordinates, intersection of curve and its asymptotes, asymptotes in polar coordinates. Curvature, radius of curvature for Cartesian curves, parametric curves, polar curves. Newton's method. Radius of curvature for pedal curves. Tangential polar equations. Centre of curvature. Circle of curvature. Chord of curvature, evolutes. Tests for concavity and convexity. Points of inflexion. Multiple points. Cusps, nodes & conjugate points. Type of cusps.
			Solid Geometry	System of conics. Confocal conics. Polar equation of a conic, tangent and normal to the conic. Sphere: Plane section of a sphere. Sphere through a given circle. Intersection of two spheres, radical plane of two spheres. Co-oxal system of spheres Cones. Right circular cone, enveloping cone and reciprocal cone. Cylinder: Right circular cylinder and enveloping cylinder.
		B.Sc. Third Semest er	Advanced Calculus	Taylor's Theorem with various forms of remainders, Darboux intermediate value theorem for derivatives, Indeterminate forms. Limit and continuity of real valued functions of two variables. Partial differentiation. Total Differentials; Composite functions & implicit functions. Change of variables. Homogenous functions & Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables.
			Partial Differential Equations	General solution, Solution of Lagrange's linear equations, Charpit's general method of solution. Compatible systems of first order equations, Jacobi's method. Linear partial differential equations of second and higher orders, Linear and non-linear homogenious and non-homogenious equations with constant co-efficients, Partial differential eqution with variable co-efficients reducible to equations with constant coefficients, their complimentary functions and particular Integrals, Equations reducible to linear equations with constant co-efficients.

			Statics	Moments and Couples. Analytical conditions of equilibrium of coplanar forces. Friction. Centre of Gravity.
		B. Sc. Fifth Semester	REAL ANALYSIS	The Fundamental theorem of integral calculus. Mean value theorems of integral calculus. Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter. Continuity, Differentiability and integrability of an integral of a function of a parameter.
			Groups and Rings	Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Largrage's theorem and its consequences, Normal subgroups, Quotient groups, Homeomorphisms, isomorphisms, automorphisms and inner automorphisms of a group. Automorphisms of cyclic groups, Permutations groups. Even and odd permutations. Alternating groups, Cayley's theorem, Center of a group and derived group of a group.
			NUMERICAL ANALYSIS	Interpolation with unequal intervals: Newton's divided difference, Lagrange's Interpolation formulae, Hermite Formula. Central Differences: Gauss forward and Gauss's backward interpolation formulae, Sterling, Bessel Formula. Probability distribution of random variables, Binomial distribution, Poisson's distribution, Normal distribution: Mean, Variance and Fitting.

Summary of Lesson Plans of College Faculty

Name of College: Govt. College for Girls Taraori (Karnal) **Academic Session: 2021-22 Semester: Odd For the Month of dec., 2021**

S.No.	Name	Class	Paper /Subject	Topics/Chapter to Be covered
3	Dr. Vinod Kumar Assistant Professor of Mathematics	**BA/B.Sc. First Semester**	Algebra	Relations between the roots and coefficients of general polynomial equation in one variable. Solutions of polynomial equations having conditions on roots. Common roots and multiple roots. Transformation of equations
			Calculus	Tracing of curves in Cartesian, parametric and polar co-ordinates. Reduction formulae. Rectification, intrinsic equations of curve.
			Solid Geometry	Central Conicoids: Equation of tangent plane. Director sphere. Normal to the conicoids. Polar plane of a point. Enveloping cone of a coincoid. Enveloping cylinder of a coincoid.
		B.Sc. Third Semester	Advanced Calculus	Differentiability of real valued functions of two variables. Schwarz and Young's theorem. Implicit function theorem. Maxima, Minima and saddle points of two variables. Lagrange's method of multipliers.
			Partial Differential Equations	Classification of linear partial differential equations of second order, Hyperbolic, parabolic and elliptic types, Reduction of second order linear partial differential equations to Canonical (Normal) forms and their solutions, Solution of linear hyperbolic equations, Monge's method for partial differential equations of second order.
			Statics	Virtual work. Forces in three dimensions. Poinsots central axis.
		B.Sc. Fifth Semester	REAL ANALYSIS	Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets, closure and interior, boundary points, subspace of a metric space, equivalent metrics, Cauchy sequences, completeness, Cantor's intersection theorem, Baire's category theorem, contraction Principle
			Groups and Rings	Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms, ideals (principle, prime and Maximal) and Quotient rings, Field of quotients of an integral domain
			NUMERICAL ANALYSIS	Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections –I & II. Eigen Value Problems: Power method, Jacobi's method, Given's method, House Holder's method, QR method, Lanczos method.

Summary of Lesson Plans of College Faculty

Name of College: Govt. College for Girls Taraori (Karnal) **Academic Session: 2020-21 Semester: Odd For the Month of Jan , 2022**

S.No.	Name	Class	Paper /Subject	Topics/Chapter to Be covered
1	Dr. Vinod Kumar Assistant Professor of Mathematics	**BA/B.Sc. First Semester**	Algebra	Nature of the roots of an equation Descarte's rule of signs. Solutions of cubic equations (Cardon's method). Biquadratic equations and their solutions.
			Calculus	Quardrature (area)Sectorial area. Area bounded by closed curves. Volumes and surfaces of solids of revolution. Theorems of Pappu's and Guilden.
			Solid Geometry	Paraboloids: Circular section, Plane sections of conicoids. Generating lines. Confocal conicoid. Reduction of second degree equations
		B.Sc. Third Semester	Advanced Calculus	Curves: Tangents, Principal normals, Binormals, Serret-Frenet formulae. Locus of the centre of curvature, Spherical curvature, Locus of centre of Spherical curvature, Involutes, evolutes, Bertrand Curves. Surfaces: Tangent planes, one parameter family of surfaces, Envelopes
			Partial Differential Equations	Cauchy's problem for second order partial differential equations, Characteristic equations and characteristic curves of second order partial differential equation, Method of separation of variables: Solution of Laplace's equation, Wave equation (one and two
			Statics	Wrenches. Null lines and planes. Stable and unstable equilibrium
		B.Sc. Fifth Semester	REAL ANALYSIS	Continuous functions, uniform continuity, compactness for metric spaces, sequential compactness, Bolzano-Weierstrass property, total boundedness, finite intersection property, continuity in relation with compactness, connectedness , components, continuity in relation with connectedness
			Groups and Rings	Euclidean rings, Polynomial rings, Polynomials over the rational field, The Eisenstein's criterion, Polynomial rings over commutative rings, Unique factorization domain, R unique factorization domain implies so is R[X1 , X2……Xn
			NUMERICAL ANALYSIS	Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one-third and three-eighth rule, Chebychev formula, Gauss Quadrature formula. Numerical solution of ordinary differential equations: Single step methods Picard's method. Taylor's series method, Euler's method, Runge-Kutta Methods. Multiple step methods; Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.

Lesson Planning for BCA-1st Semester started w.e.f. October 2021

Name of the institute Government College for Girls, Taraori , Karnal Name of the teacher with Designation- Dr Vinod Kumar , Assistant Professor

Department of Mathematics

Section BCA-1st Semester

Subject - Mathematical Foundations – I

Month	Topic/chapter covered	Test/assignment
October	Set, subsets and operations on sets, Venn diagram of sets. Power set of a set. Equivalence relation on a set and partition of a set, Permutation and combinations, Partially ordered sets, Lattices (definition and examples). Boolean algebra (definition and examples)	1st Assignment
November	Epsilon and delta definition of the continuity of a function of a single variable, Basic properties of limits, Continuous functions and classifications of discontinuities, Derivative of a function, Derivatives of Logarithmic, exponential, trigonometric, inverse trigonometrical and hyperbolic functions. Higher order derivatives.	Surprise Test
December	Formation of differential equations order and degree of the differential equation, Geometrical approach to the existence of the solution of the differential equation dy/dx=f (x,y). Ordinary differential equations of first degree and the first order, exact differential equations	2nd Assignment and Test

January	Linear differential equations of higher order with constant coefficients, Homogeneous linear differential equations and linear differential equations reducible to homogenous differential equations, Applications of differential equations to geometry,	Test