

Lesson Plan

Name of Teacher: Dr. Vinod Gill

Class: B.A./B.Sc. 1st Year/2nd Semester

Paper: Ordinary Differential Equations and Laplace Transform Session: 2021-22

Sr.No.	Months	Weeks	Topics
1.	April	1 st Week	1. Geometrical meaning of a differential equation. Exact differential equations, integrating factors.
		2 nd Week	2. First order higher degree equations solvable for x,y,p Lagrange's equations.
		3 rd Week	3. Clairaut's equations. Equation reducible to Clairaut's form. Singular solutions.
		Last Week	4. Orthogonal trajectories: in Cartesian coordinates and polar coordinates.
2.	May	1 st Week	1. Self orthogonal family of curves. Linear differential equations with constant coefficients.
		2 nd Week	2. Homogeneous linear ordinary differential equations. Equations reducible to homogeneous.
		3 rd Week	3. Linear differential equations of second order. Reduction to normal form.
		Last Week	4. Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations.
3.	June	1 st Week	1. Reduction of order of a differential equation. Method of variations of parameters.
		2 nd Week	2. Ordinary simultaneous differential equations. Solution of simultaneous differential equations.
		3 rd Week	3. Existence theorem for Laplace transforms, Linear property of the Laplace transform, Shifting theorems,
		Last Week	4. Laplace transform of derivatives and integrals, Differentiation and integration of Laplace transforms, Convolution theorem. Inverse Laplace transform, convolution theorem, Inverse Laplace transform of derivatives, solution of ordinary differential equations using Laplace transform.

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Lesson Plan

Name of Teacher: Richa Kumari

Class: B.A./B.Sc. 1st Year/2nd Semester

Paper VECTOR CALCULAS AND SOLID GEOMETRY

Session: 2021-22

Sr.No.	Months	Weeks	Topics
1.	April	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> Scalar and vector product of three vectors, product of four vectors, Reciprocal vectors, Vector differentiation Scalar Valued point functions, vector valued point functions, derivative along a curve, directional derivatives. Gradient of a scalar point function, geometrical interpretation of $\text{grad } \Phi$, Divergence and curl of vector point function. Gradient, divergence and curl of sums and product and their related vector identities, Laplacian operator. Vector integration: Indefinite Integral, Definite Integral, Standard results of Integration, Line integral, Surface integral, Volume integral. Gauss Divergence Theorem.
2.	May	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> Gauss Divergence Theorem, Divergence Theorem in Cartesian Co-ordinates, Green Theorem, Stoke's Theorem (Relation between line Integral Surface Integral).. Stokes's Theorem in Cartesian form. Green's Theorem in Plane as special case of Stoke's Theorem. General equation of second degree, Tracing of conics. System of conics, confocal conic, Tangent at any point to the conic, chord of contact.
3.	June	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> Pole of line to the conic, director circle of conic, 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-axial system of spheres. Cones: Right circular cone, Enveloping cone and reciprocal cone. Cylinder: Right circular cylinder and enveloping cylinder, Revision.

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Lesson Plan

Name of Teacher: Dr. Vinod Gill

Class: B.A./B.Sc. 2nd Year/4th Semester

Paper: Partial Differential Equations and Special Functions

Session: 2021-22

Sr.No.	Months	Weeks	Topics
1.	April	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> 1. Partial differential equations: Formation, order and degree, Linear and Non-Linear Partial differential equations of the first order: Complete solution. 2. Singular solution, General solution, Solution of Lagrange's linear equations, Charpit's general method of solution. 3. Compatible systems of first order equations, Jacobi's method. 4. Linear partial differential equations of second and higher orders, Linear and non-linear homogeneous and non-homogeneous equations with constant coefficients
2.	May	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> 1. Partial differential equation with variable coefficients reducible to equations with constant coefficients, their complimentary functions and particular integrals, 2. Equations reducible to linear equations with constant coefficients. Method of separation of variables: Solution of Laplace's equation, 3. Wave equation (one and two dimensions), Diffusion (Heat) equation (one and two dimension) in Cartesian Co-ordinate system. 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 4. Solution of linear hyperbolic equations, Monge's method for partial differential equations of second order.
3.	June	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> 1. Cauchy's problem for second order partial differential equations, Characteristic equations and characteristic curves of second order partial differential equation. 2. Series solution of differential equations – Power series method. Bessel equation and its solution. Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions 3. Legendre differential equation and its solution: Legendre function and its properties Recurrence Relations and generating functions. 4. Orthogonality of Legendre polynomial. Rodrigues' Formula for Legendre Polynomial

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Lesson Plan

Name of Teacher: Richa Kumari

Class: B.A./B.Sc. 2nd Year/4th Semester

Paper : Mechanics-I

Session: 2021-22

Sr.No.	Months	Weeks	Topics
1.	April	1 st Week 2 nd Week 3 rd Week Last Week	1. Forces in two dimension (co-planner), triangle law and polygon law of forces, 2. Lami's theorem, resultant of concurrent and coplanar forces, conditions of equilibrium of concurrent forces. 3. Parallel forces: like parallel and unequal unlike parallel forces. 4. Resultant and centre of parallel forces, Moments and Couples, Forces in three dimensions, Poinsot's central axis.
2.	May	1 st Week 2 nd Week 3 rd Week Last Week	1. Conditions for the reduction of a general system of forces in space to a single force, equations of central axis. 2. Wrenches: Definition and basic laws, resultant wrench of two wrenches, locus of the central axis of two wrenches. 3. Null lines and null planes, Velocity and acceleration along a plane curve. 4. Component of velocity and acceleration in radial, transverse, tangential and normal directions, Relative velocity and acceleration.
3.	June	1 st Week 2 nd Week 3 rd Week Last Week	1. Simple harmonic motion (SHM), Newton's laws of motion, Central Orbits. 2. Differential equations of Central Orbits in polar form and in pedal form, areal velocity, elliptic, hyperbolic and parabolic orbit, velocity in a circle. 3. Apse and apsidal distances, definition and laws, velocity from infinity, Kepler's laws of planetary motion, Equivalence of Kepler's laws of planetary motion. 4. Newton's law of gravitation, motion under the inverse square law, Revision

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Lesson Plan

Name of Teacher: Sh. Ravinder

Class: B.A. 3rd Year/6th Semester

Paper: Real and Complex Analysis

Session: 2021-22

Sr.No.	Months	Weeks	Topics
1.	April	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> 1. Improper integrals and their convergence 2. comparison tests 3. Abel's and Dirichlet's tests, Frullani's integral, 4. Integral as a function of a parameter. Continuity, differentiability and integrability of an integral of a function of a parameter. 5. Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets
2.	May	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> 1. Closure and interior, boundary points, subspace of a metric space, equivalent metrics, Cauchy sequences, completeness, Cantor's intersection theorem. 2. Baire's category theorem, Contraction Principle, continuous functions, uniform continuity. 3. Compactness for metric spaces, sequential compactness, Bolzano-Weierstrass Property, total boundedness, 4. Finite intersection property, continuity in relation with compactness, connectedness. 5. Topology of complex numbers: Trigonometric, exponential, logarithmic and hyperbolic trigonometric functions
3.	June	1 st Week 2 nd Week 3 rd Week Last Week	<ol style="list-style-type: none"> 1. Finite intersection property, continuity in relation with compactness, connectedness. 2. Extended complex plane, Stereographic projection of complex numbers. 3. Continuity and differentiability of complex functions. Analytic functions, Cauchy-Riemann equations, harmonic conjugates, harmonic functions 4. Construction of analytic functions: direct method and Milne-Thomson method.

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Lesson Plan

Name of Teacher: Dr. Vinod Gill

Class: B.A. 3rd Year/6th Semester

Paper: Mechanics-II

Session: 2021-22

Sr.No.	Months	Weeks	Topics
1.	April	1 st Week	1. Analytical conditions of equilibrium of co-planar forces: Equilibrium of three forces, conditions of equilibrium, trigonometric theorem's.
		2 nd Week	2. Conditions of equilibrium of co-planar forces (First, Second and Third form); Friction: Definition of friction and basic laws.
		3 rd Week	3. Problems based on equilibrium of rods and ladders; Centre of gravity: Basic concepts and definitions.
		Last Week	4. Centre of gravity of a uniform rod, a thin uniform lamina in the form of a parallelogram.
2.	May	1 st Week	1. A thin uniform triangular lamina, three uniform rods forming a triangle, a uniform quadrilateral lamina, lamina in the form of a trapezium, centre of gravity of a body by integration
		2 nd Week	2. Motion of a particle attached to an elastic string, Hooke's law, motion of horizontal and vertical elastic strings.
		3 rd Week	3. Definition of work, Power and Energy, work done by a variable force, work done in stretching an elastic string, principle of work and energy.
		Last Week	4. Conservative system of forces, principle of conservation of energy, impulse of a constant force and a variable force.
3.	June	1 st Week	1. Motion of a particle on smooth curves, motion on the outside and inside of a smooth vertical circle.
		2 nd Week	2. Projectile motion of a particle in a plane, velocity at any point of the trajectory.
		3 rd Week	3. Directions of projection for a particle, range and time of flight on an inclined plane.
		Last Week	4. Directions of projection for a given velocity and a given range; range and time of flight down an inclined plane. 5. Revision

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Lesson Plan

Name of Teacher: Mrs. Richa Kumari

Class: B.A. 3rd Year/6th Semester

Paper: Linear Algebra

Session: 2021-22

Sr.No.	Months	Weeks	Topics
1.	April	1 st Week	1. Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span.
		2 nd Week	2. Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces.
		3 rd Week	3. Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension, Homomorphism and isomorphism of vector spaces.
		Last Week	4. Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations.
2.	May	1 st Week	5. Null Space, Range space of a linear transformation, Rank and Nullity Theorem, algebra of Linear Transformation.
		2 nd Week	6. Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations.
		3 rd Week	7. Matrix of a linear Transformation, Change of basis.
		Last Week	8. Eigen values and Eigen vectors of linear transformations, Inner product spaces.
3.	June	1 st Week	1. Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis.
		2 nd Week	2. Bessel's inequality for finite dimensional vector spaces.
		3 rd Week	3. Gram Schmidt, Orthogonalization process, adjoint of a linear transformation and its properties.
		Last Week	4. Unitary linear transformations, Revision.

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Lesson Plan

Name of Teacher: Mr. Ravinder

Class: B.A. 3rd Year/6th Semester

Paper: Solid Geometry

Session: 2021-22

Sr.No.	Months	Weeks	Topics
1.	April	1 st Week 2 nd Week 3 rd Week Last Week	1. Central Conicoids: Equation of tangent plane. 2. Director sphere. 3. Normal to the conicoids. 4. Polar plane of a point.
2.	May	1 st Week 2 nd Week 3 rd Week Last Week	1. Enveloping cone of a coinoid. 2. Enveloping cylinder of a coinoid. 3. Paraboloids: Circular section. 4. Plane sections of conicoids.
3.	June	1 st Week 2 nd Week 3 rd Week Last Week	1. Generating lines. 2. Confocal conicoid. 3. Reduction of second degree equations. 4. Revision.

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