Lesson Plan

Academic Calendar- Even Sem 2024-25	
Teaching-I	01.01.2025 to 08.03.2025
Vacations(Holi)	09.03.2025 to 16.03.2025
Teaching-II	17.03.2025 to 30.04.2025
End Semester Examinations (Major Test)(for UTD and Affiliated Colleges)	01.05.2025 onwards
Summer Vacations (for UTD)	20.05.2025 to 30.06.2025
Summer Vacations (for Affiliated Colleges)	27.05.2025 to 07.07.2025

Name of Teacher: AJAY KUMAR **Class:** BA/BSc-2nd year **Session:** 2024-25
Subject: Mathematics **Nomenclature of Paper:**Partial Differential Equations and Special Functions **Paper Code:**BAMH-204/CML-406

Week	**Jan 25/Duration**	**Topic-** Unit-I
1	01 Jan-04 Jan	Partial differential equations: Formation, order and degree, Linear and Non-Linear Partial differential equations of the first order: Complete solution.
2	06 Jan-11 Jan	Singular solution, General solution, Solution of Lagrange's linear equations, Charpit's general method of solution.
3	12 Jan-18 Jan	Compatible systems of first order equations, Jacobi's method.
4	19 Jan-25 Jan	Linear partial differential equations of second and higher orders, Linear and non-linear homogeneous and non- homogeneous equations with constant coefficients
5	27 Jan-31 Jan	Revision of Unit-I
Week	**Feb25/Duration**	**Topic-** Unit-II
1	01 Feb-08 Feb	Partial differential equation with variable coefficients reducible to equations with constant coefficients, their complimentary functions and particular integrals
2	10 Feb-15 Feb	Equations reducible to linear equations with constant coefficients. Method of separation of variables: Solution of Laplace's equation and Test.
3	17 Feb-22 Feb	Wave equation (one and two dimensions), Diffusion (Heat) equation (one and two dimension) in Cartesian Co-ordinate system.
4	24 Feb-28 Feb	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
Week	**March25/Duration**	**Topic-** Unit-III
1	01 March-08 March	Solution of linear hyperbolic equations, Monge's method for partial differential equations of second order.
2	17 March-22 March	Cauchy's problem for second order partial differential equations, Characteristic equations and characteristic curves of second order partial differential equation.
3	24 March- 31 March	Revision of syllabus covered in 1st and 2nd week of March
Week	**April25/Duration**	**Topic-** UNIT-IV
1	01 April -05 April	Series solution of differential equations – Power series method. Bessel equation and its solution.

2	07 April -12 April	Bessel functions and their properties-Convergence, recurrence, Relations and generating functions, Orthogonality of Bessel functions
3	14 April -19 April	Legen dre differential equation and its solution: Legendre function and its propertiesRecurrence Relations and generating functions.
4	21 April-26 April	Orthogonality of Legendre polynomial. Rodrigues' Formula for Legendre Polynomial AND Revision
5	28 April-30 April	Revision

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Name of Teacher: AJAY KUMAR	**Class:** BA/BSc-2nd year	**Session:** 2024-25
Subject: Mathematics	**Nomenclature of Paper:**Mechanics-II	**Paper Code:**BAMH-305(i)/CML-606(i)
Week	**Jan 25/Duration**	**Topic-** Unit-I
1	01 Jan-04 Jan	Analytical conditions of equilibrium of co-planar forces: Equilibrium of three forces, conditions of equilibrium, trigonometric theorem's.
2	06 Jan-11 Jan	Analytical conditions of equilibrium of co-planar forces: Equilibrium of three forces, conditions of equilibrium, trigonometric theorem's.(Remaining part)
3	12 Jan-18 Jan	Conditions of equilibrium of co-planar forces (First, Second and Third form);
4	19 Jan-25 Jan	Friction: Definition of friction and basic laws.
5	27 Jan-31 Jan	Revision of Unit-I
Week	**Feb25/Duration**	**Topic-** Unit-II
1	01 Feb-08 Feb	Problems based on equilibrium of rods and ladders; Centre of gravity: Basic concepts and definitions, centre of gravity of a uniform rod, a thin uniform lamina in the form of a parallelogram and test.
2	10 Feb-15 Feb	Problems based on equilibrium of rods and ladders; Centre of gravity: Basic concepts and definitions, centre of gravity of a uniform rod, a thin uniform lamina in the form of a parallelogram and test.(Remaining Part)
3	17 Feb-22 Feb	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
4	24 Feb-28 Feb	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 (Remaining Part)
Week	**March25/Duration**	**Topic-** Unit-III
1	01 March-08 March	Motion of a particle attached to an elastic string, Hooke's law, motion of horizontal and vertical elastic strings and Test.
2	17 March-22 March	Definition of work, Power and Energy, work done by a variable force, work done in stretching an elastic string, principle of work and energy.
3	24 March- 31 March	Conservative system of forces, principle of conservation of energy, impulse of a constant force and a variable force . and test
Week	**April25/Duration**	**Topic-** UNIT-IV
1	01 April -05 April	Motion of a particle on smooth curves, motion on the outside and inside of a smooth vertical circle
2	07 April -12 April	Projectile motion of a particle in a plane, velocity at any point of the trajectory.
3	14 April -19 April	Directions of projection for a particle, range and time of flight on an inclined plane.

4	21 April-26 April	Directions of projection for a given velocity and a given range; range and time of fight down an inclined plane.
5	28 April-30 April	Revision

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Name of Teacher: AJAY KUMAR		**Class:** BA/BSc-2nd year **Session:** 2024-25
Subject: Mathematics		**Nomenclature of Paper:**Linear Algebra **Paper Code:**BAMH-305(i)/CML-606(i)
Week	**Jan 25/Duration**	**Topic**- Unit-I
1	01 Jan-04 Jan	Vector spaces, subspaces
2	06 Jan-11 Jan	Sum and Direct sum of subspaces, Linear span.
3	12 Jan-18 Jan	Linearly Independent and dependent subsets of a vector space. Finitely generated vector space
4	19 Jan-25 Jan	Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces.
5	27 Jan-31 Jan	Revision of Unit-I
Week	**Feb25/Duration**	**Topic**- Unit-II
1	01 Feb-08 Feb	Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension
2	10 Feb-15 Feb	Homomorphism and isomorphism of vector spaces.
3	17 Feb-22 Feb	Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations, Null Space, Range space of a linear transformation,
4	24 Feb-28 Feb	Rank and Nullity Theorem, algebra of Linear Transformation.
Week	**March25/Duration**	**Topic**- Unit-III
1	01 March-08 March	Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations.
2	17 March-22 March	Matrix of a linear Transformation, Change of basis and Test.
3	24 March- 31 March	Eigen values and Eigen vectors of linear transformations, Inner product spaces.
Week	**April25/Duration**	**Topic**- UNIT-IV
1	01 April -05 April	Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis.
2	07 April -12 April	Bessel's inequality for finite dimensional vector spaces.
3	14 April -19 April	Gram Schmidt, Orthogonalization process, adjoint of a linear transformation and its properties.
4	21 April-26 April	Unitary linear transformations.
5	28 April-30 April	Revision

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Name of Teacher: AJAY KUMAR		**Class:** BA/BSc-2nd year **Session:** 2024-25
Subject: Mathematics		**Nomenclature of Paper:** Mechanics-I **Paper Code:** BAMH-205/CML-407
Week	**Jan 25/Duration**	**Topic**- Unit-I
1	01 Jan-04 Jan	Forces in two dimension (co-planner), triangle law and polygon law of forces.
2	06 Jan-11 Jan	Lami's theorem, resultant of concurrent and coplanar forces, conditions of equilibrium of concurrent forces.
3	12 Jan-18 Jan	Parallel forces: like parallel and unequal unlike parallel forces.
4	19 Jan-25 Jan	Resultant and centre of parallel forces, Moments and Couples.
5	27 Jan-31 Jan	Revision of Unit-I and Test.
Week	**Feb25/Duration**	**Topic**- Unit-II
1	01 Feb-08 Feb	Forces in three dimensions, Poinsot's central axis.
2	10 Feb-15 Feb	Conditions for the reduction of a general system of forces in space to a single force, equations of central axis.
3	17 Feb-22 Feb	Wrenches: Definition and basic laws, resultant wrench of two wrenches, locus of the central axis of two wrenches.
4	24 Feb-28 Feb	Null lines and null planes, Velocity and acceleration along a plane curve .
Week	**March25/Duration**	**Topic**- Unit-III
1	01 March-08 March	Component of velocity and acceleration in radial, transverse, tangential and normal directions, Relative velocity and acceleration.
2	17 March-22 March	Simple harmonic motion (SHM), Newton's laws of motion, Central Orbits.
3	24 March- 31 March	Revision of syllabus covered in 1st and 2nd week of March
Week	**April25/Duration**	**Topic**- UNIT-IV
1	01 April -05 April	Differential equations of Central Orbits in polar form and in pedal form, areal velocity, elliptic, hyperbolic and parabolic orbit, velocity in a circle.
2	07 April -12 April	Apse and apsidal distances, definition and laws, velocity from infinity, Kepler's laws of planetary motion.
3	14 April -19 April	Equivalence of Kepler's laws of planetary motion and Newton's law of gravitation, motion under the inverse square law.

4	21 April-26 April	Revision
5	28 April-30 April	Revision

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Name of Teacher: AJAY KUMAR **Class:** BA/BSc-2nd year **Session:** 2024-25
Subject: Mathematics **Nomenclature of Paper:**Real and Complex Analysis **Paper Code:**BAMH-306(i)/CML-607(i)

Week	**Jan 25/Duration**	**Topic-** Unit-I
1	01 Jan-04 Jan	Definition and examples of metric spaces,
2	06 Jan-11 Jan	neighborhoods, limit points, interior points, open and closed sets
3	12 Jan-18 Jan	Closure and interior, boundary points, subspace of a metric space, equivalent metrics,
4	19 Jan-25 Jan	Cauchy sequences, completeness, Cantor's intersection theorem.
5	27 Jan-31 Jan	Revision of Unit-I
Week	**Feb25/Duration**	**Topic-** Unit-II
1	01 Feb-08 Feb	Baire's category theorem, Contraction Principle, continuous functions, uniform continuity.
2	10 Feb-15 Feb	Compactness for metric spaces, sequential compactness, Bolzano-Weierstrass Property, total boundedness,
3	17 Feb-22 Feb	Finite intersection property, continuity in relation with compactness, connectedness.
4	24 Feb-28 Feb	Improper integrals and their convergence, comparison tests, Abel's and Dirichlet's tests
Week	**March25/Duration**	**Topic-** Unit-III
1	01 March-08 March	Frullani's integral, Integral as a function of a parameter. Continuity, differentiability and integrability of an integral of a function of a parameter.
2	17 March-22 March	Topology of complex numbers: Trigonometric, exponential, logarithmic and hyperbolic trigonometric functions and Test.
3	24 March- 31 March	Revision of syllabus covered in 1st and 2nd week of March and test
Week	**April25/Duration**	**Topic-** UNIT-IV
1	01 April -05 April	Finite intersection property, continuity in relation with compactness, connectedness.
2	07 April -12 April	Extended complex plane, Stereographic projection of complex numbers.
3	14 April -19 April	Continuity and differentiability of complex functions. Analytic functions, Cauchy-Riemann equations, harmonic conjugates, harmonic functions

4	21 April-26 April	Construction of analytic functions: direct method and Milne-Thomson method.
5	28 April-30 April	Revision

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Name of Teacher: AJAY KUMAR		**Class:** BA/BSc-2nd year	**Session:** 2024-25
Subject: Mathematics		**Nomenclature of Paper:**Solid Geometory	**Paper Code:**BAMH-307(i)/CML-608(i)
Week	**Jan 25/Duration**	**Topic**- Mentioned below	
1	01 Jan-04 Jan	Central Conicoids: Equation of tangent plane.	
2	06 Jan-11 Jan	Central Conicoids: Equation of tangent plane (Remaining Part)	
3	12 Jan-18 Jan	Director sphere	
4	19 Jan-25 Jan	Director sphere and Test. (Remaining Part)	
5	27 Jan-31 Jan	Revision	
Week	**Feb25/Duration**	**Topic**- Mentioned below	
1	01 Feb-08 Feb	Normal to the conicoids,Polar plane of a point.	
2	10 Feb-15 Feb	Normal to the conicoids,Polar plane of a point.(Remaining Part)	
3	17 Feb-22 Feb	Revision	
4	24 Feb-28 Feb	Revision	
Week	**March25/Duration**	**Topic**- Mentioned below	
1	01 March-08 March	Enveloping cone of a coincoid.	
2	17 March-22 March	Enveloping cylinder of a coincoid.	
3	24 March- 31 March	Paraboloids: Circular section, Plane sections of conicoids.	
Week	**April25/Duration**	**Topic**- Mentioned below	
1	01 April -05 April	Generating lines.	
2	07 April -12 April	Confocal conicoid.	
3	14 April -19 April	Reduction of second degree equations.	
4	21 April-26 April	Revision	
5	28 April-30 April	Revision	