Mathematics Department

Session: 2023-2024

Class: B.A/B.Sc.-I Year (First Semester)

Teacher Incharge: Mrs. Poonam Saini

Nomenclature of the paper: Calculus

Month	Week	Topics to be covered
July	21.07.23-22.07.23	€-S definition of limit of a function.
	24.07.23-31.07.23	Limit and Continuity of a real valued function, Basic
		properties of limits, continuous functions and classification
		of discontinuities, differentiability.
August	1.08.23-05.08.23	Application of L Hospital Rule to Indeterminate forms.
	07.08.23-12.08.23	Successive differentiation, Leibnitz theorem, Maclaurin and
		Taylor' series.
		Assignment and Test Series
	14.08.23-19.08.23	Asymptotes-Horizontal, vertical and oblique asymptotes in
		Cartesian coordinates, intersection of curve and its
		asymptotes, asymptotes in polar coordinates.
	21.08.23-26.08.23	Curvature, radius of curvature of Cartesian curves.
	28.08.23-31.08.23	Radius of curvature of parametric curves, polar curves,
-		Newton's method.
September	01.09.23-09.09.23	Radius of curvature for pedal curves, tangential polar
		equations. Centre of curvature, circle of curvature, chord
		of curvature and evolutes.
	11.09.23-16.09.23	lests for concavity and convexity, points of inflexion,
		multiple points, cusps, nodes and conjugate points , types
		of cusps.
	18 09 23-23 09 23	Tracing of curves in Cartesian, parametric and polar
	10.05.25 25.05.25	coordinates.
	25.09.23-30.09.23	Reduction formulae.
October	01.10.23-07-10.23	Rectification, intrinsic equation of curve.
		, , , , , , , , , , , , , , , , , , , ,
	09.10.23-14.10.23	Revision and Sessionals.
	16.10.23-21.10.23	Quadrature, Sectorial area.
	23.10.23-30.10.23	Area bounded by closed curves, Volume and surface area
		of solids of revolutions
November	1.11.23-04.11.23	Volume and surface area of solids of revolutions examples
	06.11.23-10.11.23	Revision and Tests
	10.11.23-16.11.23	Diwali Vacations

Semester: odd

Paper code: B23-MAT-101

Mathematics Department

Class: B.A/B.Sc.-II Year (Third Semester)

Teacher Incharge: Mrs. Poonam Saini

Nomenclature of the paper: Advanced Calculus

Month	Week	Topics to be covered
July	21.07.23-22.07.23	Indeterminate forms.
	24.07.23-31.07.23	Continuity, Sequential Continuity, properties of
		continuous functions, Uniform continuity, chain rule
		of differentiability.
August	1.08.23-05.08.23	Mean value theorems, Rolle's Theorem and Lagrange's
		mean value theorem and their geometrical
		interpretations.
	07.08.23-12.08.23	Taylor's Theorem with various forms of remainders,
		Darboux intermediate value theorem for derivatives.
	14.08.23-19.08.23	Limit and continuity of real valued functions of two
		variables.
	21.08.23-26.08.23	Partial differentiation. Total Differentials, Composite
		functions & implicit functions. Change of variables.
		Assignment based on unit I and II
	28.08.23-31.08.23	Revision and Test Series
September	01.09.23-09.09.23	Homogenous functions & Euler's theorem on
		homogeneous functions.
	11.09.23-16.09.23	Taylor's theorem for functions of two variables.
	18.09.23-23.09.23	Differentiability of real valued functions of two
		variables.
	25.09.23-30.09.23	Schwarz and Young's theorem. Implicit function
		theorem.
October	01.10.23-07-10.23	Maxima, Minima and saddle points of two variables.
		Lagrange's method of multipliers.
	09.10.23-14.10.23	Revision and Test Series (Sessionals)
	16.10.23-21.10.23	Curves: Tangents, Principal normals, Binormals,
		Serret-Frenet formulae.
	23.10.23-30.10.23	Locus of the centre of curvature, Involutes, evolutes,
		Bertrand Curves.
November	01.11.23-04.11.23	Surfaces: Tangent planes, one parameter family of
		surfaces
	06.11.23-10.11.23	Envelopes. Assignment and revision test.
	10.11.23-16.11.23	Diwali Vacations

Session: 2023-2024

Semester: odd

Paper code: BM-231

Mathematics Department

Session: 2023-2024

Class: B.A. /B.Sc. II Year (Third Semester)

Semester: Odd

Teacher Incharge: Dr. JatinderKaur

Paper: Partial Differential Equations (BM 232)

Month	Dates	Topics covered
July	21.07.23-30.07.23	Review of Basics of Previous classes, Formulas Used and
		their applications. Syllabus and books prescription.
August	01 .08.23 -04.08.23	Formation of Partial Differential Equations.
	06.08.23- 12.08.23	First Order Linear Partial Differential Equations.
	14.08.23-19.08.23	First Order Non- Linear Partial Differential Equations.
		Complete solution, Singular solution, General solution.
	21.08.23- 26.08.23	Linear Partial Differential Equations of Second and Higher
		Orders, Linear and non-linear homogeneous and non-
		homogeneous equations.
	28.08.23-31.08.23	Revision of Previous Chapters with class tests.
September	01.09.23-02.09.23	Revision of Previous Chapters with class tests.
	03.09.23 -09 .09.23	Partial Differential Equations with variables coefficients
		reducible to equations with constants coefficients.
		Assignment of last five years KUK papers of Unit 1 and
		Unit2.
	11.09.23 -16 .09.23	Classification and Canonical forms of Second Order Linear
		Partial Differential Equations
	24.09.23 -30 .09.23	Monge's method for Partial Differential Equations of
		Second Order
October	03.10.23-07.10.23	Assignment of last five years KUK papers given.
		Discussion/Problem of assignment's questions. Thoroughly
		revise last year papers.
	09.10.23-14.10.23	Sessioal Exams. Method of separation of variables:
		solution of wave equation (one and two dimensions),
	16.10.23-21.10.23	Heat wave equation (one and two dimensions), Laplace's
		equation.
	23.10.23-31.10.23	Revision of solution of wave equation (one and two
		dimensions), Heat wave equation (one and two
		dimensions), Laplace's equation.
November	02.11.23-04.11.23	Assignment of last five years KUK papers of Unit 3 and Unit
		4. Discussion/Problem of assignment's questions.
		Thoroughly revise last year papers.

06.11.23 09.11.23	Chapter wise revision of all covered syllabus with test.
10.11.23- 16.11.23	Diwali Vacations
17.11.23-24.11.23	Unit wise test of all covered Units. Discussion of mistakes done by students of every unit.
25.11.23-onwards	University Examination

Mathematics Department

Session: 2023-2024

Class: B.A. /B.Sc. II Year (Third Semester)

Teacher Incharge: Ms. Sonia

Paper: Statics	(BM-233)
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Month	Dates	Topics to be covered
August	10.08.23-19.08.23	Composition and resolution of forces. Magnitude and
		direction of resultant, Lami's Theorem.
	21.08.23-26.08.23	Parallel Forces, Movement and Couples, Center of a number
		of parallel forces Revision and assignment
	28.08.23-31.08.23	Analytical Condition of Equilibrium of coplanar forces:
		Equilibrium of three forces acting at a point, Trigonometrical
		theorem. Revision
September	01.09.23-09.09.23	Friction: Laws of statical friction Center OF Gravity: Center of
		gravity of a uniform rods. Assignment.
	11.09.23-16.09.23	Center of gravity of uniform triangular lamina.
	18.09.23-23.09.23	Center of gravity of a body by integration Revision and Test
	25.09.23-30.09.23	Virtual Work: Principle of virtual work ,virtual work done by
		the tension.
October	03.10.23-07-10.23	Virtual work done by thrust .Test
	09.10.23-14.10.23	Forces in Three Dimensions: Parallopiped of forces,
	16.10.23-21.10.23	Poinsot central axis, Invariants . Revision and Test
	23.10.23-30.10.23	Wrenches: Resultant of two given wrenches.
November	01.11.23-04.11.23	Null lines and Planes: Null lines,
	06.11.23-10.11.23	Null plans, Equation of conjugate lines. Revision and Test
	10.11.23-16.11.23	Diwali Vacations

Mathematics Department

Class: B.A/B.Sc.-III Year (Fifth Semester)

Teacher Incharge: Mrs. Poonam Saini

Nomenclature of the paper: Real Analysis

Month Week Topics to be covered July 21.07.23-22.07.23 Riemann integral -Introduction 24.07.23-31.07.23 Integrability of continuous and monotonic functions. Discussion of related problems. Theorems on Integrability and discussion of excercize 1.08.23-05.08.23 August problems The Fundamental theorem of integral calculus. Mean 07.08.23-12.08.23 value theorems of integral calculus Improper integrals and their convergence. 14.08.23-19.08.23 21.08.23-26.08.23 Comparison tests, Abel's and Dirichlet's tests, Frullani's integral. Revision and Test Series 28.08.23-31.08.23 01.09.23-09.09.23 Integral as a function of a parameter. Continuity, September Differentiability and integrability of an integral of a function of parameter. Assignment based on unit I and II 11.09.23-16.09.23 18.09.23-23.09.23 Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets. 25.09.23-30.09.23 Closure and interior, boundary points, Subspace of a metric space. Equivalent metrics. Cauchy sequences, completeness, October 01.10.23-07-10.23 Cantor's intersection theorem. **Revision and Sessionals** 09.10.23-14.10.23 16.10.23-21.10.23 Continuous functions, uniform continuity. 23.10.23-30.10.23 Compactness for metric spaces, Sequential compactness, Bolzano-Weierstrass property, total boundedness. November 1.11.23-04.11.23 Finite intersection property, Continuity in relation with compactness. Continuity in relation with connectedness. 06.11.23-10.11.23 Assignment, Revision of topics and tests. **Diwali Vacations** 10.11.23-16.11.23

Session: 2023-2024

Semester: odd

Paper code: BM-351

Mathematics Department

Session 2023-2024

Semester: Odd

Class: B.A. /B.Sc. III Year (Fifth Semester)

Teacher Incharge: Ms. Meenakshi

Paper: Group and Ring (BM 352)

Month	Dates	Topics to be covered
August	14.08.2023-19.08.2023	Definition of group ,properties of groups,
		Cosets left and right cosets
	21.08.2023-26.08.2023	Index of a subgroups, coset decomposition,
		lagrange's theorem, normal subgroups, quotient groups
	28.08.2023-31.08.2023	Assignment and Test Series
September	01.09.2023-09.09.2023	Homomorphisms, Isomorphisms,
		automorphisms and inner automorphisms of a group, Automorphisms of cyclic groups
	11.09.2023- 16.09.2023	Permutations groups, even and odd
		permutations, Alternating groups, Cayley's theorem centre of groups and derived group of a
		group
	18.09.2023- 23.09.2023	Assignment and Test Series
	25.09.2023- 30.09.2023	Introduction to rings, Subrings, integral domains and fields
October	03.10.2023-07.10.2023	Ideals and quotient rings, Field of quotients of I.D
	09.10.2023-14.10.2023	Euclidean rings, polynomials rings, polynomial over the rational field assignment and Test Series
	16.10.2023-21.10.2023	Assignment and Test Series
	23.10.2023-31.10.2023	The Eisenstein's criterion of irreducibility, Polynomial rings over commutative rings
	01.11.2023- 04.11.2023	Unique factorisation domain, R unique factorisation domain
November	06.11.2023-10.11.2023	Revision tests
	10.11.2023- 16.11.2023	Diwali Vacations

Mathematics Department

Session: 2023-2024

Class: B.A. /B.Sc. III Year (Fifth Semester)

Paper: Numerical Analysis (BM 353)

Teacher Incharge: Dr.JatinderKaur

Month	Dates	Topics covered
July	21 .07.23-30.07.23	Review of Basics of Previous classes, Formulas Used
		and their applications. Syllabus and books
		prescription.
August	01 .08.23 -04.08.23	Finite difference operators and their relations,
		Interpolation with equal intervals.
	06.08.23-12.08.23	Newton's forward and backward Interpolation.
	14.08.23-19.08.23	Interpolation with unequal intervals; Newton's
		divided difference, Lagrange's interpolation.Hermit's
		formula.
	21.08.23-26.08.23	Central differences; Gauss forward and backward
		interpolation formulae.
	28.08.23-31.08.23	Sterling and Bessel's formula.
September	01 .09.23 -02.09.23	Derivatives of functions using: Newton's forward
		and backward interpolation, Gauss forward and
		backward interpolation formulae.
	03.09.23 -09 .09.23	Derivatives of functions using: Sterling and Bessel's
		formula, Newton's divided difference formula.
	11.09.23 - 16 .09.23	Eigen Value Problems: Power method, Jacobi's
		method, Given's method.
	24.09.23 - 30 .09.23	Problems of Power method, Jacobi's method,
		Given's method. House-Holder's method with its
		applications.
October	03.10.23-07.10.23	Numerical Integration: Trapezoidal rule, Simpson's
		rule, Chebychev formula.
	09 10 23-14 10 23	Sessional Exam Quadrature formula Numerical
	09.10.23 14.10.23	solution of differential equations: Picard's method
	16 10 23-21 10 23	Taylor's series method. Fuler's method. Fuler's
	10.10.23 21.10.23	Modified method, Runge- Kutta method
	23.10.23-31.10.23	Practice of Euler's method, Euler's Modified
	23.10.23 31.10.23	method, Runge- Kutta method, Miline's Simpson
		method.
November	02.11.23-04.11.23	Probability distribution of random variables.
		Binomial distribution.

06.11.23 09.11.23	Poisson's distribution, Mean and Variance. Normal distribution.
10.11.23- 16.11.23	Diwali Vacations
17.11.23-24.11.23	Unit wise test of all covered Units. Discussion of mistakes done by students of every unit. Special attention to weak students.
25.11.23 onwards	University Examination

Mathematics Department

Class: M.Sc. (P) (First Semester)

Teacher Incharge: Ms. Sonia 401)

Paper: Advanced abstract Algebra-I (MM-

Month	Dates	Topics to be covered
August	10.08.23-19.08.23	Automorphisms and Inner automorphism, Normalizer and
		Centralizer, Conjugate elements and conjugacy classes,
	21.08.23-26.08.23	Class equation of finite group and its applications Derived
		group(or a commutator subgroup), Perfect Groupws
	28.08.23-31.08.23	Zassenhau 's Lemma, Normal and Composition series,
		Schier's refinement theorem, Jordan Holder theorem
September	01.09.23-09.09.23	Composition series of order pn and of Abelian groups,
		Cauchy theorem, II-groups and p-groups, Sylow II-
		subgroup and Sylow p-subgroup,
	11.09.23-16.09.23	SylowIst, IInd, IIIrd theorems. Application of Sylow
		theory Characteristic of a ring with unity
	18.09.23-23.09.23	Prime field Z/pZ and Q, Algebraic and transcendental
		element, Conjugate elements, Algebraic extensions,
		finitely generated algebraic extensions
	25.09.23-30.09.23	. Algebraic closure and algebraically closed fields,
		splitting fields, finite fields, Normal extensions
October	03.10.23-07-10.23	Separable elements, separable polynomials and separable
		extensions
	09.10.23-14.10.23	Theorem of primitive element, perfect fields, Galois
		extensions, Galois group of an extension, Dedekind
		lemma,
	16.10.23-21.10.23	Fundamental theorem of Galois theory, Frobenious
		automorphism of a finite field.Klein's 4-group and
		Diheadral group. Galois group of polynomials
	23.10.23-30.10.23	Fundamental theorem of Algebra, Solvable groups,
		Derived series, Simplicity of the Alternating group
		$An(n \ge 5)$
November	01.11.23-04.11.23	Roots of unity Cyclotomic polynomials and their
		irreducibility over Q, Radicals extensions

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06.11.23-10.11.23	Cyclic extensions, Solvability of Polynomials by radical
	over Q, Symmetric functions, elementary symmetric
	functions
10.11.23-16.11.23	Diwali Vacations

Mathematics Department

Session: 2023-2024

Class: M.Sc. (P) (First Semester)

Teacher Incharge: Ms.Vandana

Paper: Real Analysis-I (MM-402)

Month	Dates	Topics to be covered
August	21.08.23-26.08.23	Riemann Stieltjes integral, Properties of the integral,
		Integration and Differentiation.
	28.08.23-31.08.23	The fundamental theorem of integral Calculus, Integration
		by parts, integration of vector -valued functions,
		Rectifiable curves.
September	01.09.23-09.09.23	Pointwise and uniform convergence, Cauchy criterion for
		uniform convergence, Weirstrass M-test.
	11.09.23-16.09.23	Abel's test and Dirichlet's test for uniform convergence,
		uniform convergence and continuity.
	18.09.23-23.09.23	Uniform convergence and Reimann Stieltjes integration,
		uniform convergence and differentiation. Existence of a
		real continuous nowhere differentiable function.
	25.09.23-30.09.23	Equicontinous families of functions, Weierstrass
		approximation theorem, functions of several variables.
October	03.10.23-07-10.23	Linear transformations, Derivative in an open subset of
		R _n , Chain rule, Partial Derivatives.
	09.10.23-14.10.23	Directional derivatives, The Contraction principle, Inverse
		function theorem.
	16.10.23-21.10.23	Revision Test
	23.10.23-31.10.23	Implicit function theorem, Jacobians, Extremum problems
		with constraints, Lagrange's multiplier method.
November	02.11.23-04.11.23	Derivatives of higher order. Mean value theorem,
		interchange of order of the differentiation, Differentiation
		of integrals.
	06.11.23-10.11.23	Revision Test
	10.11.23-16.11.23	Diwali Vacations
	17.11.23-24.11.23	Uniqueness theorem for power series. Trignometric
		functions, Fourier series, Gamma function.

Mathematics Department

Teacher Incharge : Ms.Vandana

Subject: Topology(MM-403)

Session: 2023-2024

Class : M.Sc.(P)

Semester: I

Month	Dates	Topics to be covered
August	21.08.23-26.08.23	Definition & examples of topological spaces, Neighbourhood
		, Nbd.System of a point & properties, Interior point & interior
		of a set, interior as operator & properties.
	28.08.23-31.08.23	Definition of a closed set, limit point, derived set, definition
		of closure and derived set, Adherent point, properties of
		closure, Closure as operator and its properties.
September	01.09.23-09.09.23	Boundary of a set, dense set and characterization, Relative
		Topology and subspace of a topology space. Alternative
		method of defining topology using properties of nbd system.
	11.09.23-16.09.23	Interior operator, Closed set, Closure operator and base, First
		C'ble space, Second C'ble space, Separable cpace their
		relationship & hereditary properties
	18.09.23-23.09.23	Countability lindelof Theorem, Comparison of topology on a
		set, intersection, union, infimum, spremum& collection of all
		topologies on as et as complete lattice.Definition, Example
		and characteristic of ctsfunc.
	25.09.23-30.09.23	Revision Test & Composition of continuous functions, open
		and closed functions, Homeomorphism, Embedding
		Tychonoff Product, projection maps, their Continuity and
		openness
October	02.10.23-07-10.23	Characterisation of Product topology as smallest topology
		with projection continuous, Continuity of a function from a
		space into product of spaces, 10 11,12, Regular, 13
	00 10 22 14 10 22	Separation axions.
	09.10.25-14.10.25	T3 Productive Property of T1 & T2 spaces
		Quotient topology with respect to a map. cts of function with
		domain Hausdoffness of quotient space
	16 10 23-21 10 23	Completely regular & Tychonoff their hereditary and
	10.10.20 21.10.20	Productive property Embedding Lemma and Theorem.
		Definition and example of Normal & T4 spaces. Urysohn's
		Lemma & Assignment
	23 10 23-31 10 23	Complete regularity of regular normal space. Definition and
		example of filters. Po set, finer filter, Ultra filter principle

		Convergence of Filters, limit Point & limit point of filters & relationship between them.
November	02.11.23-04.11.23	Continuity in terms of Convergence of filter, Hausdorffness & filter Convergence., compact spaces, Subset as compact, open cover, f.i.p, Continuity and compact set, separation properties.
	06.11.23-10.11.23	Closedness of compact subset, Hausdorff space and its consequence. Regularity and normality. Compactness and filter convergence.
	10.11.23-16.11.23	Diwali Vacations
	17.11.23-24.11.23	Convergence of filter in a product space. Tychonoff Product theorem using Filters, Compactification and Hausdorff Compactification, Stone – CechCompactification

Mathematics Department

Session: 2023-2024

Class: M.Sc. (P) (First Semester)

Teacher Incharge: Ms. Meenakshi

Paper: Complex Analysis-I(MM-404)

Month	Dates	Topics to be covered
August	14.08.2023–19.08.2023	Power series, its convergence, radius of convergence, examples, sum and product. Differentiability of sum function of power series, property of a differentiable function with derivative zero
	21.08.2023-26.08.2023	Expz and its properties, logz, power of a complex number (z), their branches with analyticity, Cauchy- Goursat theorem, Cauchy theorem for simple and multiple connected domains
	28.08.2023-31.08.2023	Assignment and Test Series
September	01.09.2023 - 09.09.2023	Cauchy integral formula, higher order derivative of Cauchy integral formula, Gauss mean value theorem, Cauchy inequality
	11.09.2023 - 16.09.2023	Entire function, Morera's theorem, fundamental theorem of algebra, Taylor's theorem, Liouville's theorem
	18.09.2023 - 23.09.2023	Assignment and Test Series
	25.09.2023 - 30.09.2023	Maximum modulus principle, Minimum modulus principle, Schwarz Lemma, Singularity and their classification, Laurent series
October	03.10.2023-07.10.2023	Poles of a function and its order, cassorati-weiertrass theorem, poles and zeros of meromorphic function
	09.10.2023-14.10.2023	The argument principle, Rouche's theorem, inverse function theorem, Residue: Residue at a singularity, residue at a simple pole
	16.10.2023-21.10.2023	Assignment and Test Series
	23.10.2023-31.10.2023	residue at infinity, $f(x)$ cosmx dx, poles on the real axis, integral of many valued function
	01.11.2023-04.11.2023	Cauchy residue theorem and its use to calculate certain integrals,
November	06.11.2023-10.11.2023	Definite integral Revision tests
	10.11.2023-16.11.2023	Diwali Vacations

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Mathematics Department

Class: M.Sc. (P) (First Semester)

Teacher Incharge: Ms. Vandana/Ms. Meenaks Paper: Differential Equations-I(MM-405)

Month	Dates	Topics to be covered
August	21.08.23-26.08.23	Linear differential systems: Definitions and notations. Linear
		homogeneous systems, Preliminaries: Initial Value Problem
		and €-approximate Solution, Equicontinuous Set of Functions.
	28.08.23-31.08.23	Fundamental matrix, Basic theorems: Ascoli- Arzela theorem,
		Cauchy – Peano existence theorem and its corollary.
September	01.09.23-09.09.23	Adjoint systems & related theorems, Gronwall'sinequality
		Lipschitz condition. Differential inequalities and uniqueness.
	11.09.23-16.09.23	Revision Test & Successive approximations, Picard-Lindelöf
		theorem.
	18.09.23-23.09.23	reduction to smaller homogeneous System, Continuation of
		solution, Maximal interval of existence.
	25.09.23-30.09.23	Non homogeneous linear systems; variation of constants,
		Extension theorem. Kneser's theorem (statement only).
October	02.10.23-07-10.23	Linear systems with constant coefficients. Linear systems with
		periodic coefficients, Maximal And Minimal Solution,
		Differential Inequalities.
	09.10.23-14.10.23	Floquet theory, Higher order equations: Linear differential
		equation (LDE) of order n, Taking problems of Maximal and
		Minimal.
	16.10.23-21.10.23	Linear combinations, Linear dependence and linear
		independence of solutions & Assignments, A Theorem of
		Wintner, KamkeTheorem, Nagumo Theorem
	23.10.23-31.10.23	Wronskian; Definition, Necessary Condition For Dependence
		and Linear Independence of Solutions of L.D.E, Abel identity,
		Osgood Theorem.
November	02.11.23-04.11.23	Variation Parameters, Adjoint Equation, Revision Tests.
	06.11.23-10.11.23	Fundamental Set, Green Formula, Non Homogeneous L .D .E.
		System of differential equations, the n-th order equation.
	10.11.23-16.11.23	Diwali Vacations
	17.11.23-24.11.23	Lagrange Identity, linear Equation of order n with Constant Co-
		efficients, Dependence of solutions on initial conditions and
		parameters: Preliminaries, continuity and differentiability

Session: 2023-2024

Mathematics Department

Teacher Incharge : Ms.Vandana

Subject: Functional Ananlysis (501)

Month	Days	Topics to be covered
August	21.08.23-26.08.23	Normed linear spaces, Banach spaces and examples,
		subspace of a Banach space, completion of a normed space.
	28.08.23-31.08.23	Quotient space of a normed linear space its completeness,
		product of normed spaces, finite dimensional normed spaces
		and subspaces, equivalent norms, compactness and finite
Sentember	01 09 23-09 09 23	F Riesz's lemma Bounded and continuous linear operators
September	01.07.25-07.07.25	differentiation operator, integral operator, bounded linear
		extension, linear functional.
	11.09.23-16.09.23	Bounded linear functional, continuity and boundedness,
		definite integral, canonical mapping, linear operators and
		functionals on finite dimensional spaces. Revision & Tests.
	18.09.23-23.09.23	Hahn-Banach theorem for real linear spaces, complex linear
		spaces and normed linear spaces, application to bounded
		linear functionals on C[a,b], Riesz-representation theorem for
		bounded functionals on C[a,b].
	25.09.23-30.09.23	Adjoint operator, norm of the adjoint operator. Reflexive
		spaces, uniform boundedness theorem and some of its applications to the space of polynomials and fourier series.
October	02.10.23-07-10.23	Inner product spaces, Hilbert spaces and their examples
		Pythagorean theorem, Apollonius identity, inequality,
		continuity of inner product, completion of an inner product
	00 10 02 14 10 02	space.
	09.10.23-14.10.23	Subspace of a Hilbert space, complements and direct sums,
		Taking problems
	16.10.23-21.10.23	Assignment & Strong and weak convergence. Convergence
		or Sequence of Opreators. Open mapping & closed graph
		theorem.
	23.10.23-31.10.23	Orthonormal sets and sequences, Bessel's inequality, series
		related to orthonormal sequences and sets, total(complete)
		orthonormal sets and sequence.

Session: 2023-2024

Class : M.Sc.(F)

Semester: IIIrd

November	02.11.23-04.11.23	Revision Test
	06.11.23-10.11.23	Parseval's identity, separable Hilbert space Representation of
		functionals on Hilbert Space, presentation theorem for
		bounded linear functionals on a Hilbert space.
	10.11.23-16.11.23	Diwali Vacations
	17.11.23-25.11.23	Sesquilinear form, Riesz representation theorem for bounded
		sesquilinear forms on a Hilbert space, Hilbert adjoint
		operator, its existence uniqueness, properties of Hilbert
		adjoint operators, self adjoint, unitary, normal, positive and
		projection operator.

Mathematics Department

Session: 2023-2024

Class: M.Sc. (F) (Third Semester)

Teacher Incharge: Ms. Sonia

Paper: Analytical Mechanics and Calculus of variation

(MM-502)

Month	Dates	Topics to be covered	
August	10.08.23-19.08.23	Shortest distance, Minimum surface of revolution,	
		Brachistochrone, problem, Geodesic, Fundamental lemma of	
		Calculas of variation, Euler's equation for one dependent function	
		of one and several Independent variables,	
	21.08.23-26.08.23	Its generalization to (I) Functinal depending on 'n' dependent	
		functions (II) Functional depending on higher order derivatives,	
		Variational derivative	
	28.08.23-31.08.23	Revision Test	
September	01.09.23-09.09.23	Invariance of Euler's equations, natural boundary conditions and	
		transition conditions, conditional extremum under geometric	
		constraints and under integral constraints, Variable end points.	
	11.09.23-16.09.23	Free and constraints systems, constraints and their classification,	
		Generalised coordinates, Holonomic and Non-Holonomic systems,	
		Scleronomic and Rheonomic systems, Generalized Potential.	
		Revision Test	
	18.09.23-23.09.23	Possible and virtual displacements, ideal constraints, Lagrange's	
		equation of first kind Principle of virtual displacements D'	
		Alembert's principle,	
	25.09.23-30.09.23	Holonomic Systems independent coordinates, generalized forces,	
		Lagrange's equation of second kindl.Uniqueness of solution,	
		Theorem on variation of total Energy,	
October	03.10.23-07-10.23	Potential Lagrange's equations for potential forces equation for	
		conservative fields, Hamilton's variables, Donkin's theorem,	
		Hamilton canonical equations.	
	09.10.23-14.10.23	Routh's equations, Cyclic coordinates, Poisson's bracket,	
		Poisson's identity, Jacobi's-Poisson's theorem, Hamilton's	
		Principle, second form of Hamilton's principle, Poincare-Carton	
		integral invariant, Whittaker's equations	
	16.10.23-21.10.23	Jacobi's equations, Principle of least action, canonical	

		transformations, Revision Test	
	23.10.23-31.10.23	Hamilton-Jacobi equation, Jacobi theorem, Method of separation	
		of variables. Testing the canonical character of a transformation.	
November	01.11.23-04.11.23	Lagrange's brackets, Simplicial nature of the Jacobian matrix of a	
		Canonical Transformations	
	06.11.23-10.11.23	Invariance of Lagrange brackets and Poisson's bracket under	
		canonical transformation Revision Test	
	10.11.23-16.11.23	Diwali Vacations	

Mathematics Department

Teacher Incharge : Ms.Vandana

Subject: Elasticity (503 opt.(I))

Month	Week	Topics to be covered
August	21.08.23-26.08.23	Tensor Algebra: Coordinate Transformation, Cartesian
		tensor of different order, Properties of tensors.
	28.08.23-31.08.23	Isotropic tensor of different orders and relation between
		them, Symmetric and Skew Symmetric tensors.
September	01.09.23-09.09.23	Eigen Values and eigenvectors of a tensor. Scalar, vector,
		tensor functions, comma Notation.
	11.09.23-16.09.23	gradient, divergence, curl of vectors/tensors field
	18.09.23-23.09.23	Revision & Tests
	25.09.23-30.09.23	Affine transformation, Infinitesimal Affine deformation,
		Geometrical Interpretation of strain Component.
October	02.10.23-07-10.23	Strain quadric of Cauchy, Principal strains and invariance,
		general Infinitesimal deformation.
	09.10.23-14.10.23	Sessionals & Assignments
	16.10.23-21.10.23	saint-variant's equation of Compatibility & Revision, Stress
		quadric of Cauchy, Principal Stress and Invariants.
	23.10.23-31.10.23	Maximum normal and shear stress, Mohr's Circle,
		Generalised Hooke's Law.
November	02.11.23-04.11.23	Strain energy function & Connection with Hooke's Law,
		Revision Tests & Assignments
	06.11.23-10.11.23	Homogeneous Isotropic Medium, Elastic Moduli for
		Isotropic media.
	10.11.23-16.11.23	Diwali Vacations
	17.11.23-24.11.23	Uniqueness of solution., Beltremi Hickbell compatibility
		equations, Clapeyron's Theorem, Saint- venant's Principle.

Session: 2023-2024

Class : M.Sc.(F)

Semester: IIIrd

Mathematics Department

Class: M.Sc. (F) (Third Semester)

Teacher Incharge: Ms. Sonia

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Paper: Fluid Mechanics (MM-504(opt. I))

Month	Dates	Topics to be covered
August	10.08.23-19.08.23	Kinematics of fluid in motion, Velocity at a point of a fluid,
		Lagrangian & Eulerian methods, Stream lines, Path lines &
		Streak lines, vorticity and circulation.
	21.08.23-26.08.23	Vortex lines, Acceleration & Material derivative.Equation of
		continuity (vector or cartesian form), Reynolds transport
		theorem.
	28.08.23-31.08.23	General analysis of fluid motion, Properties of fluids-static
		Assignment and test
September	01.09.23-09.09.23	Dynamic pressure, Boundary surfaces and Boundary surfaces
		conditions, Irrotational &rotational motions, Velocity potential.
	11.09.23-16.09.23	Lagrange's and Euler's equation of motion, Bernoulli's
		theorem & its applications in one dimensional flow problems.
		Test and Revision
	18.09.23-23.09.23	Kelvins circulation theorem Vorticity equation, Energy
		equation for incompressible flow, Kinetic energy of irrotational
		flow
	25.09.23-30.09.23	Kelvins minimum energy theorem, mean potential over a
		spherical surface energy of infinite liquid, Uniqueness theorem
October	03.10.23-07-10.23	Stress components in a real fluid, Relations between,
		rectangular components of stress. Revision test
	09.10.23-14.10.23	Connection between stress and gradients of velocity, Navier-
		Stoke's equations of motion
	16.10.23-21.10.23	Steady flows between two parallel plates, Plane Poiseuille and
		Couette flows, Navier-Stock equations in flows having axis of
		symmetry
	23.10.23-31.10.23	Steady flow in circular pipe, The Hagen-Poiseuille flow, Steady
		flow between two co-axial cylinders, flow between two
		concentric rotating cylinders,
November	01.11.23-04.11.23	Steady flow through tubes of uniform cross-section in the form
		(IEllipse, (II) Equilateral triangle, (III)rectangle under constant
		pressure gradient, uniqueness theorem.

Session: 2023-2024

06.11.23-10.11.23	Revision test
10.11.23-16.11.23	Diwali Vacations

Mathematics Department

Session: 2023-2024

Semester-ODD (III)

Name of the faculty: Ms. Meenakshi

Class: M.Sc. (P) (Third Semester)

Paper: Integral Equation(MM-505)

Month	Dates	Topics to be covered
August	14.08.2023 -19.08.2023	Definition of integral Equation and their classifications. Eigen values and Eigen Functions. Special kinds of kernel convolution integral. inner and scalar product of two function
	21.08.2023 - 26.08.2023	Reduction to a system of algebraic Equations ,Fredholm alternative, Fredholm theorem, Fredholm alternative theorem.
	28.08.2023-31.08.2023	Revision and Test Series
September	01.09.2023 - 09.09.2023	Method of successive approximations, iterative scheme for Fredholm and Volterra integral equations of the second kind.
	11.09.2023 - 16.09.2023	Conditions of uniform convergence and uniqueness of series solution. Some results about the resolvent kernel. Application of iterative scheme to Volterra integral equations of the second kind
	18.09.2023 - 23.09.2023	Classical Fredholm theory, the method of solution of Fredholm equationRevision and Test Series
	25.09.2023 - 30.09.2023	Fredholm First Kind, Fredholm second theorem, Fredholm third theorem. Symmetric Kernels, Introduction Complex Hilbert space
October	03.10.2023-07.10.2023	An orthonormal system of functions, Riesz – Fisher theorem. A complete two – Dimensional orthonormal set over the rectangle.
	09.10.2023-14.10.2023	Revision and Test Series
	16.10.2023-21.10.2023	Expansion in eigen functions and Bilinear form, Hilbert -Schmidt theorem and some immediate consequences. Definite kernels and Mercer theorem. Solution of a symmetric integral Equation. Approximation of a general by a separable kernel.
	23.10.2023-31.10.2023	Approximation of a general by a separable kernel The

		operator method in the theory of integral equations
		Rayleigh – Ritz method for finding first Eigen value.
	01.11.2023-04.11.2023	Abel integral Equation inversion formula for singular
		equation with kernel of the type $h(s)-h(t)$
N7 1	06.11.2023-10.11.2023	The Cauchy principal value for integrals solution of the
November		Cauchy-type singular integral equation Assignment and
		Revision work
	10.11.2023-16.11.2023	Diwali Vacations

Mathematics Department

Class: B.Com-I (First Semester)

Teacher Incharge: Mrs. Poonam Saini

Nomenclature of the paper: Business Mathematics-I

Month	Week	Topics to be covered
July	21.07.23-22.07.23	Representation of sets, Equivalent sets.
	24.07.23-31.07.23	Power sets, Complement of a set, Venn diagrams: Union
		and intersection of sets, De-Morgan's Laws.
August	1.08.23-05.08.23	Logical Statements and Truth Tables.
	07.08.23-12.08.23	Logarithms: Laws of Operations, Log Tables.
	14.08.23-19.08.23	Arithmatic and Geometric Progression.
	21.08.23-26.08.23	Assignment and Revision Test.
	28.08.23-31.08.23	Definition of a Matrix, order, equality and type of matrices.
September	01.09.23-09.09.23	Operation on Matrices-Addition, Multiplication and
		Multiplication with a scalar and their simple properties.
	11.09.23-16.09.23	Determinant of a square matrix, properties of determinants,
		minors, co-factor and application of determinants in finding
		the area of triangle.
	18.09.23-23.09.23	Adjoint and Inverse of a square matrix, Solution of a system
		of linear equations by examples.
	25.09.23-30.09.23	Revision of previous topics on matrices.
October	01.10.23-07-10.23	Different type of Interest rates, Type of Annuties
	09.10.23-14.10.23	Revision and Sessionals.
	16.10.23-21.10.23	Present value and amount of annuity.
	23.10.23-30.10.23	Valuation of simple loans and debantures.
November	01.11.23-04.11.23	Problems related to sinking funds
	06.11.23-10.11.23	Revisions and class tests.
	10.11.23-16.11.23	Diwali Vacations

Session: 2023-2024

Semester: odd

Paper code: B23-COM-104

Mathematics Department

Session: 2023-2024

Semester: Odd

Class: B.Com.I (First Semester)

Teacher Incharge: Ms. Richa

Paper: Business Mathematics(B-23-COM-104)

Month	Date	Topics to be covered
July	21.07.23-22.07.23	Representations of sets
	24.07.23-31.07.23	Finite and infinite sets, Subsets, Equivalent sets, Power sets,
		Universal set, Union and intersection of sets, Difference of two
		sets
August	01.08.23-05.08.23	Complement of a set, Venn diagram, De-Morgan's laws and their applications.
	07.08.23-12.08.23	Logical statements and truth tables, simple and compound statements, logical connectives
	14.08.23-19.08.23	Definition of matrices and their types, Operations on matrices Additions, multiplication with a scalar properties .Types of matrix, Symmetric and skew-symmetric matrices, Minors, Co- factors.
	21.08.23-26.08.23	Adjoin and inverse of a square matrix, Solutions of a system of linear equations up to order 3.
	28.08.23-31.08.23	Assignment
September	01.09.23-09.09.23	Applications of determinants in finding the area of triangle ad inverse of square matrix Types of matrix ,Symmetric and skew- symmetric matrices, Minors, Co-factors
	11.09.23-16.09.23	Solution of a system of linear equation by example
	18.09.23-23.09.23	Revision of unit I & unit II
	25.09.23-30.09.23	Test series
October	03.10.23-07-10.23	Introduction of compound interest and annuities
	09.10.23-14.10.23	Different types of interest, types of annuities
	16.10.23-21.10.23	Present value and amount of an annuity{including the case of continuous compound)
	23.10.23-31.10.23	Valuation of simple loan and debentures
November	01.11.23-04.11.23	Problems to find inverse of a matrix.
		Problems to find determinant of a square matrix
	06.11.23-10.11.23	Revision Test
	10.11.23-16.11.23	Diwali Vacations

Mathematics Department

Session: 2023-2024

Semester: Odd

Class: B.C.A-I (First Semester)

Teacher Incharge: Ms. Richa

Paper: Mathematical foundation for Computer science-I(B-23-CAP-104)

Month	Dates	Topics to be covered
July	21.07.23-22.07.23	Sets and their representations, Empty set,
	24.07.23-31.07.23	Finite and infinite sets, Subsets, Equal sets, Power sets,
		Universal set, Union and intersection of sets, Difference of
		two sets
August	01.08.23-05.08.23	Complement of a set, Venn diagram, De-Morgan's laws and
		their applications.
	07.08.23-12.08.23	An introduction to matrices and their types, Operations on
		matrices,
	14.08.23-19.08.23	Symmetric and skew-symmetric matrices, Minors, Co-factors.
		Determinant of a square matrix
		Assignment of Matrix and its Types
	21.08.23-26.08.23	Adjoin and inverse of a square matrix, Solutions of a system
		of linear equations up to order 3.
	28.08.23-31.08.23	Quadratic equations, Solution of quadratic
		equations.Arithmetic progression
September	01.09.23-09.09.23	Geometric progression, Harmonic progression, Arithmetic
		mean (A.M.), Geometric mean (G.M.)
	11.09.23-16.09.23	Harmonic mean (H.M.), Relation between A.M., G.M. and
		H.M.
	18.09.23-23.09.23	The concept of differentiation, differentiation of simple
		functions,
	25.09.23-30.09.23	Problems involving formulation and solution of quadratic
		equations in one variable
October	03.10.23-07-10.23	Use of differentiation for solving problems related to real-life
		situations
	09.10.23-14.10.23	Test of unit I and II
	16.10.23-21.10.23	Problems to find first derivatives of functions
	23.10.23-31.10.23	Differentiation of simple algebraic, trigonometric and
		exponential functions
November	01.11.23-04.11.23	Problems based on De Morgan's Laws.
		Problems related to Venn diagrams.
	06.11.23-10.11.23	Problems to find inverse of a matrix.
		□ Problems to find determinant of a square matrix

			10.11.23-16.11.23	Diwali Vacations
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Mathematics Department

Session: 2023-2024

Semester: Odd

Class: B.B.A-I (First Semester)

Teacher Incharge: Ms. Richa

Paper: Business Mathematics-I(104)

Month	Week	Topics to be covered
July	21.07.23-22.07.23	Set Theory: Representation of sets, equivalent sets, power set
	24.07.23-31.07.23	complement of a set. Venn Diagrams: Union and Intersection of
		sets.
August	01.08.23-05.08.23	Quadratic Equations with real roots
	07.08.23-12.08.23	Relations between roots and coefficient of the quadratic equations
	14.08.23-19.08.23	Problem related to set theory and equivalent sets.
	21.08.23-26.08.23	Methods of solving a quadratic equations
	28.08.23-31.08.23	Methods- factoring, using the quadratic formula
		Completing the square.
September	01.09.23-09.09.23	Binomial Theorem (positive index)
	11.09.23-16.09.23	Test of unit I and II
	18.09.23-23.09.23	Properties of Limits and function
	25.09.23-30.09.23	Practice sum of limit and function
October	03.10.23-07-	Matrix System: Matrices, definition
	10.23	
	09.10.23-14.10.23	Basic operations on matrices (Addition and multiplication)
	16.10.23-21.10.23	Properties of Determinants ,calculation of value of determinants
		upto third order.
	23.10.23-31.10.23	Determinant of a square matrix,
November	01.11.23-04.11.23	Inverse of a square matrix, Cramer's rule
	06.11.23-10.11.23	Assignment and test series
	10.11.23-16.11.23	Diwali Vacations