DEPARTMENT OF MATHEMATICS

Sub– Number Theory and Trignometry
Name of Teacher: Dr. Poonam Kumari

Class – B.SC-I(B), B.A-I

Session : 2022-23

Topics	**Date**	**Remarks**
Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple) Primes, Fundamental Theorem of Arithemetic. Linear Congruences, Fermat's theorem. Wilson's theorem and its converse. Linear Diophanatine equations in two variables	16-01-23 to 07-02-23	
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.	08-02-23 to 01-03-23	
Greatest integer function [x]. The number of divisors and the sum of divisors of a natural number n (The functions d(n) and σ(n)). Moebius function and Moebius inversion formula. De Moivre's Theorem and its Applications. Expansion of trigonometrical functions.	02-03-23 to 02-04-23	
Direct circular and hyperbolic functions and their properties. Inverse circular and hyperbolic functions and their properties. Logarithm of a complex quantity. Gregory's series. Summation of Trigonometry series.	03-04-23 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– Algebra

Name of Teacher: Dr. Poonam Bai

Class –B.SC –I(A)

Session : 2022-23

Topics	**Date**	**Remarks**
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. Row rank and column rank of a matrix. Eigenvalues, eigenvectors and the characteristic equation of a matrix. Minimal polynomial of a matrix. Cayley Hamilton theorem and its use in finding the inverse of a matrix.	16-08-2022 to 16-09-2022	
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.	17-09-2022 to 10-10-2022	
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	11-10-2022to 10-11-2022	
Nature of the roots of an equation Descarte's rule of signs. Solutions of cubic equations (Cardon's method). Biquadratic equations and their solutions. .	11-11-2022 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– Algebraic number theory
Name of Teacher: Dr. Poonam Bai
Class –M.SC (F)
Session : 2022-23

Topics	**Date**	**Remarks**
Algebraic Number and Integers : Gaussian integers and its properties, Primes and fundamental theorem in the ring of Gaussian integers, Integers and fundamental theorem in $Q(\omega)$ where $\omega^3 = 1$, Algebraic fields, Primitive polynomials, The general quadratic field $Q(\sqrt{m})$, Units of $Q(\sqrt{2})$, Fields in which fundamental theorem is false, Real and complex Euclidean fields, Fermat theorem in the ring of Gaussian integers, Primes of $Q(\sqrt{2})$ and $Q(\sqrt{5})$.	16-01-23 to 07-02-23	—
primitive elements. Countability of set of of algebraic numbers, Liouville theorem and generalizations, Transcendental numbers, Algebraic number fields, Liouville theorem of primitive elements, Ring of algebraic inte- gers, Theorem	08-02-23 to 01-03-23	
Norm and trace of an algebraic number, Non degeneracy of bilinear pairing, Existence of an integral basis, Discriminant of an algebraic number field, Ideals in the ring of algebraic integers, Explicit construction of integral basis, Sign of the discriminant, Cyclotomic fields, Calculation for quadratic and cubic cases.	02-03-23 to 02-04-23	
Integral closure, Noetherian ring, Characterizing Dedekind domains, Fractional ideals and unique factorization, G.C.D. and L.C.M. of ideals, Chinese remainder theorem, Dedekind theorem, Rami- fied and unramified extensions, Different of an algebraic	03-04-23 to onwards	

number field, Factorization in the ring of algebraic integers.		

DEPARTMENT OF MATHEMATICS

Sub– Analytic Number Theory

Name of Teacher: Dr. Poonam Bai

Class –M.SC (F)

Session : 2022-23

Topics	**Date**	**Remarks**
Distribution of primes, Fermat and Mersenne numbers, Farey series and some results concerning Farey series, Approximation of irrational numbers by rationals, Hurwitz's theorem, Irrationality of e and π.	16-08-2022 to 16-09-2022	
The arithmetic in Z_n, The group U_n, Primitive roots and their existence, the group U_{p^n} (p-odd) and U_{2^n}, The group of quadratic residues Q_n, Quadratic residues for prime power moduli and arbitrary moduli, The algebraic structure of U_n and Q_n.	17-09-2022 to 10-10-2022	
Riemann Zeta Function $\zeta(s)$ and its convergence, Application to prime numbers, $\zeta(s)$ as Euler product, Evaluation of $\zeta(2)$ and $\zeta(2k)$. Diophantine equations $ax+by=c$, $x^2+y^2=z^2$ and $x^4+y^4=z^4$, The representation of number by two or four squares, Waring problem, Four square theorem, The numbers g(k) and G(k), Lower bounds for g(k) and G(k).	11-10-2022to 10-11-2022	
Arithmetic functions $\varphi(n)$, $\tau(n)$, $\sigma(n)$ and $\sigma_k(n)$, U(n), N(n), I(n). s Definitions, examples and simple properties, Perfect numbers, Mobius inversion formula, The Mobius function $\mu(n)$, The order and average order of the function $\varphi(n)$, $\tau(n)$ and $\sigma(n)$.	11-11-2022 to onwards	

DEPARTMENT OF MATHEMATICS

Sub–Calculus

Class – B.A -I

Session : 2022-23

Name of Teacher:

Dr. Manisha Garg

Topics	Date	Remarks
Definition of the limit of a function. Basic properties of limits, Continuous functions and classification of discontinuities. Differentiability. Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.	16/08/22 to 16/09/22	
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	17/09/22 to 10/10/22	
Tracing of curves in Cartesian, parametric and polar co-ordinates. Reduction formulae. Rectification, intrinsic equations of curve.	11/10/22 to 10/11/22	
Quardrature (area)Sectorial area. Area bounded by closed curves. Volumes and surfaces of solids of revolution. Theorems of Pappu's and Guilden	11/11/22 to Onwards	

DEPARTMENT OF MATHEMATICS

Sub–CLASSICAL MECHANICS

Name of Teacher: Dr. Manisha Garg

Class –M.SC (F)

Session : 2022-23

Topics	Date	Remarks
Moments and products of inertia, The theorems of parallel and perpendicular axes, Angular momentum of a rigid body about a fixed point and about fixed axes, Principal axes and principal moments of inertia of a rigid body, Kinetic energy of a rigid body rotating about a fixed point, Momental ellipsoid and equimomental systems, Coplanar mass distributions, General motion of a rigid body. (Relevant topics from the book of Chorlton).	16-01-23 to 07-02-23	
Free and constrained systems, Constraints and their classification, Holonomic and non-holonomic systems, Scleronomic and Rheonomic systems, Possible and Virtual Displacements, Possible veloc- ities and possible accelerations, Ideal constraints, The General equation of dynamics, Lagrange's equations of the first kind. The Principle of Virtual Displacements, D' Alembert's Principle. Independent coordinates and Generalized forces, Lagrange's equations of the second kind in independent coordinates, Generalized velocities and accelerations, Kinetic energy as a function of generalized velocities, Uniqueness of solution, Theorem on Variation of total energy, Potential, Gyroscopic and Dissipative Forces.	08-02-23 to 01-03-23	
Lagrange's equations for Potential Forces, The Generalized Potential, Lagrangian and Hamiltonian variables, Donkin's theorem, Hamilton canonical equations, Routh variables and Routh function, Routh's equations, Cyclic or Ignorable coordinates, Poisson Bracket and their simple properties, Poisson identity, Jacobi-Poisson theorem. Hamilton's principle, Poincare-Carton Integral Invariant, Generalized Conservative Systems, Whittaker's equations, Jacobi's equations, Lagrangian action and the principle of least action. The Universal Integral Invariant of Poincare, Lee Hwa-	02-03-23 to 02-04-23	

Chung's Theorem (Statement only		
Canonical transformations, Necessary and sufficient condition for a transformation to be canonical, Univalent canonical transformations, Free canonical transformations, Hamilton-Jacobi equation, Jacobi's theorem, Method of separation of variables in HJ equation. The Lagrange Brackets, Necessary and sufficient conditions for the canonical character of a transformation in terms of Lagrange Brackets, The Simplicial Nature of the Jacobian Matrix of a canonical transformation, Conditions of canonicity of a transformation in terms of Poisson Brackets, Invariance of the Poisson Brackets in a canonical transformation.	03-04-23 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– Dynamics

Name of Teacher: Dr. Poonam Bai

Class –B.SC\B.A.III

Session : 2022-23

Topics	Date	Remarks
Velocity and acceleration along radial, transverse, tangential and normal directions. Relative velocity and acceleration. Simple harmonic motion. Elastic strings.	16-01-23 to 07-02-23	
Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy. Definitions of Conservative forces and Impulsive forces.	08-02-23 to 01-03-23	
Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.	02-03-23 to 02-04-23	
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.	03-04-23 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– Field Extensions &Galois Theroy
Name of Teacher: Dr. Poonam Bai
Class –M.SC (P)
Session : 2022-23

Topics	**Date**	**Remarks**
Fields, Prime fields, Finite field extensions, Degree of field extensions, Simple Extensions, Algebraic extensions, Splitting fields, Algebraically closed fields.	16-01-23 to 07-02-23	
Separable and inseparable extensions, Perfect fields. Monomorphisms and their linear independence, Automorphism of fields, Fixed fields, Normal extensions, The fundamental theorem of Galois theory.	08-02-23 to 01-03-23	
Finite fields, Existence of GF(p^n), Construction of finite fields, Primitive elements, Langrage's theorem on primitive elements, Roots of unity, Cyclotomic polynomials, Cyclotomic extensions of rational number field.	02-03-23 to 02-04-23	
Solutions by radicals, Extension by radicals, Generic polynomial, Insolvability of the general poly- nomial of degree $n \geq 5$ by radicals, Ruler and compasses construction.	03-04-23 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– Group & Rings

Name of Teacher: Dr. Poonam Bai

Class –B.A-III

Session : 2022-23

Topics	**Date**	**Remarks**
Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups, Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Largrage's theorem and its consequences, Normal subgroups, Quotient groups,	16-08-2022 to 16-09-2022	
. Homoomorphisms, isomophisms, 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.	17-09-2022 to 10-10-2022	
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.	11-10-2022to 10-11-2022	
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]	11-11-2022 to onwards	
	17-09-2022 to 10-10-2022	

	11-10-2022to 10-11-2022	
	11-11-2022 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– INNER PRODUCT SPACE

Name of Teacher: Dr.POONAM KUMARI

Class –M.SC (F)

Session : 2022-23

Topics	Date	Remarks
Hilbert Spaces: Inner product spaces, Hilbert spaces, Schwarz's inequality, Hilbert space as normed linear space, Convex sets in Hilbert spaces, Projection theorem	16-01-23 to 07-02-23	
Orthonormal sets, Separability, Total Orthonormal sets, Bessel's inequality, Parseval's identity. Conjugate of a Hilbert space, Riesz representation theorem in Hilbert spaces, Adjoint of an operator on a Hilbert space, Reflexivity of Hilbert space, Self-adjoint operators, Positive operators, Product of Positive Operators.	08-02-23 to 01-03-23	
Projection operators, Product of Projections, Sum and Difference of Projections, Normal and unitary operators, Projections on Hilbert space, Spectral theorem on finite dimensional space. Measure space, Generalized Fatou's lemma, Measure and outer measure, Extension of a measure, Caratheodory extension theorem.	02-03-23 to 02-04-23	
Canonical transformations, Necessary and sufficient condition for a transformation to be canonical, Univalent canonical transformations, Free canonical transformations, Hamilton-Jacobi equation, Jacobi's theorem, Method of separation of variables in HJ equation. The Lagrange Brackets, Necessary and sufficient conditions for the canonical character of a transformation in terms of Lagrange Brackets, The Simplicial Nature of the Jacobian Matrix of a canonical transformation, Conditions of canonicity of a transformation in terms of Poisson Brackets, Invariance of the Poisson Brackets in a canonical transformation.	03-04-23 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– INNER PRODUCT SPACE

Name of Teacher: Dr.POONAM KUMARI

Class –M.SC (F)

Session : 2022-23

DEPARTMENT OF MATHEMATICS

Sub– Mathematical Analysis

Name of Teacher: Dr. Poonam Kumari

Class – M .Sc (P)

Session : 2022-23

Topics	Date	Remarks
Riemann-Stieltjes integral, Existence and properties, Integration and differentiation, The fundamental theorem of calculus, Integration of vector-valued functions, Rectifiable curves.	12/09/22 to 10/10/22	
Sequence and series of functions, Pointwise and uniform convergence, Cauchy criterion for uniform convergence, M_n-test for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, Uniform convergence and continuity, Uniform convergence and Integration, Uniform convergence and differentiation, Weierstrass approximation theorem	11/10/22 to 14/11/22	
Power series, uniform convergence and uniqueness theorem, Abel's theorem, Tauber's theorem. Functions of several variables, Linear Transformations, Euclidean space R^n, Derivatives in an open subset of R^n, Chain Rule, Partial derivatives, Continuously Differentiable Mapping, Young and Schwarz theorems.	15/11/22 to 13/12/22	

Taylor theorem, Higher order differentials, Explicit and implicit functions, Implicit function theorem, Inverse function theorem, Change of variables, Extreme values of explicit functions, Stationary values of implicit functions, Lagrange multipliers method, Jacobian and its properties.	14/12/22 to Onwards	

DEPARTMENT OF MATHEMATICS

Sub– Fluid Dynamics

Name of Teacher:

Class – M .Sc (F)

Dr. Manisha Garg

Session : 2022-23

Topics	Date	Remarks
Kinematics - Velocity at a point of a fluid. Eulerian and Lagrangian methods. Stream lines, path lines and streak lines. Velocity potential. Irrotational and rotational motions. Vorticity and circulation. Equation of continuity. Boundary surfaces. Acceleration at a point of a fluid. Components of acceleration in cylindrical and spherical polar co-ordinates.	16/08/22 to 12/09/22	
Pressure at a point of a moving fluid. Euler equation of motion. Equations of motion in cylindrical and spherical polar co-ordinates. Bernoulli equation. Impulsive motion. Kelvin circulation theorem. Vorticity equation. Energy equation for incompressible flow. Kinetic energy of irrotational flow. Kelvin minimum energy theorem. Kinetic energy of infinite fluid. Uniqueness theorems.	13/09/22 to 14/10/22	
Axially symmetric flows. Liquid streaming part a fixed sphere. Motion of a sphere through a liquid at rest at infinity. Equation of motion of a sphere. Kinetic energy generated by impulsive motion. Motion of two concentric spheres. Three-dimensional sources, sinks and doublets. Images of sources, sinks and doublets in rigid impermeable infinite plane and in impermeable spherical surface.	15/10/22 to 13/11/22	
Two dimensional motion; Use of cylindrical polar co-ordinates. Stream function. Axisymmetric flow. Stoke stream function. Stoke stream function of basic flows. Irrotational motion in two-dimensions. Complex velocity potential. Milne-Thomson circle theorem. Two-dimensional sources, sinks, doublets and their images. Blasius theorem.	14/11/22 to Onwards	

DEPARTMENT OF MATHEMATICS

Sub– Mathematical Statistics Name of Teacher:

Class – M .Sc (P) Dr. Manisha Garg

Session : 2022-23

Topics	Date	Remarks
Probability: Definition and various approaches of probability, Addition theorem, Boole's inequality, Conditional probability and multiplication theorem, Independent events, Mutual and pairwise independence of events, Bayes' theorem and its applications.	12/09/22 to 10/10/22	
Random variable and probability functions: Definition and properties of random variables, Discrete and continuous random variables, Probability mass and density functions, Distribution function, Concepts of bivariate random variable: joint, marginal and conditional distributions. Mathematical expectation: Definition and its properties, Variance, Covariance, Moment generating function- Definitions and their properties.	11/10/22 to 14/11/22	
Discrete distributions: Uniform, Bernoulli, Binomial, Poisson and Geometric distributions with their properties. Continuous distributions: Uniform, Exponential and Normal distributions with their properties.	15/11/22 to 13/12/22	

Testing of hypothesis: Parameter and statistic, Sampling distribution and standard error of estimate, Null and alternative hypotheses, Simple and composite hypotheses, Critical region, Level of significance, One tailed and two tailed tests, Two types of errors. Tests of significance: Large sample tests for single mean, Single proportion, Difference between two means and two proportions.	14/12/22 to Onwards	

DEPARTMENT OF MATHEMATICS

Sub– Number Theory and Trignometry

Name of Teacher: Dr. Manisha Garg

Class – B.SC-I(A)

Session : 2022-23

Topics	**Date**	**Remarks**
Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple) Primes, Fundamental Theorem of Arithemetic. Linear Congruences, Fermat's theorem. Wilson's theorem and its converse. Linear Diophanatine equations in two variables	16-01-23 to 07-02-23	
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.	08-02-23 to 01-03-23	
Greatest integer function [x]. The number of divisors and the sum of divisors of a natural number n (The functions d(n) and σ(n)). Moebius function and Moebius inversion formula. De Moivre's Theorem and its Applications. Expansion of trigonometrical functions.	02-03-23 to 02-04-23	
Direct circular and hyperbolic functions and their properties. Inverse circular and hyperbolic functions and their properties. Logarithm of a complex quantity. Gregory's series. Summation of Trigonometry series.	03-04-23 to onwards	

DEPARTMENT OF MATHEMATICS

Sub-Numerical Analysis

Name of Teacher : Dr. Poonam Kumari

Class – B.SC-III & B.A-III

Session : 2022-23

Topics	Date	Remarks
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. Interpolation with unequal intervals: Newton's divided difference, Lagrange's Interpolation formulae, Hermite Formula.	16/08/22 to 16/09/22	
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.	17/09/22 to 10/10/22	
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.	11/10/22 to 10/11/22	
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.	11/11/22 to Onwards	

DEPARTMENT OF MATHEMATICS

Sub– Programming in C and Numerical Method

Name of Teacher: Dr. Manisha Garg

Class – B.SC-II(B), B.A-II

Session : 2022-23

Topics	Date	Remarks
Programmer's model of a computer, Algorithms, Flow charts, Data types, Operators and expressions, Input / outputs functions. Decisions control structure: Decision statements, Logical and conditional statements,	16-01-23 to 07-02-23	
Implementation of Loops, Switch Statement & Case control structures. Functions, Preprocessors and Arrays. Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters. Structures: Definition, using Structures, use of Structures in Arrays	08-02-23 to 01-03-23	
and Arrays in Structures. Pointers: Pointers Data type, Pointers and Arrays, Pointers and Functions. Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method Secant method, Newton-Raphson's method. Newton's iterative method for finding pth root of a number, Order of convergence of above methods.	02-03-23 to 02-04-23	
Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Triangularization method (LU decomposition method). Crout's method, Cholesky Decomposition method. Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.	03-04-23 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– Real Analysis

Name of Teacher: Dr. Poonam Bai

Class –B.SC –III & B.A-III

Session : 2022-23

Topics	**Date**	**Remarks**
Riemann integral, Integrabililty of continuous and monotonic functions, The Fundamental theorem of integral calculus. Mean value theorems of integral calculus	16-08-2022 to 16-09-2022	
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.	17-09-2022 to 10-10-2022	
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	11-10-2022to 10-11-2022	
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.	11-11-2022 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– REAL & COMPLEX ANALYSIS

Name of Teacher: Dr. Poonam Kumari

Class – B.SC-III(A)

Session : 2022-23

Topics	**Date**
Jacobians, Beta and Gama functions, Double and Triple integrals, Dirichlets integrals, change of order of integration in double integrals.	16-01-23 to 07-02-23
Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Co- efficients, Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of Intervals	08-02-23 to 01-03-23
Extended Complex Plane, Stereographic projection of complex numbers, continuity and differentiability of complex functions, Analytic functions, Cauchy-Riemann equations. Harmonic functions.	02-03-23 to 02-04-23
Mappings by elementary functions: Translation, rotation, Magnification and Inversion. Conformal Mappings, Mobius transformations. Fixed pints, Cross ratio, Inverse Points and critical mappings.	03-04-23 to onwards

DEPARTMENT OF MATHEMATICS

Sub– Special Function & Intgral Equation

Name of Teacher: Dr. Poonam Kumari

Class – B.SC-II (A)

Session : 2022-23

Topics	Date	Remarks
Definitions Series solution of differential equations – Power series method, 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.	16-01-23 to 07-02-23	
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.	08-02-23 to 01-03-23	
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.	02-03-23 to 02-04-23	
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.	03-04-23 to onwards	

DEPARTMENT OF MATHEMATICS

Sub– Statics

Name of Teacher:

Class – B.SC-II, B.A-II

Dr. Manisha Garg

Session : 2022-23

Topics	Date	Remarks
Composition and resolution of forces. Parallel forces. Moments and Couples	16/08/22 to 14/09/22	
Analytical conditions of equilibrium of coplanar forces. Friction. Centre of Gravity	14/09/22 to 14/10/22	
Virtual work. Forces in three dimensions. Poinsots central axis	15/10/22 to 11/11/22	
Wrenches. Null lines and planes. Stable and unstable equilibrium.	12/11/22 to Onwards	

DEPARTMENT OF MATHEMATICS

Sub– Viscous Fluid Dynamics

Name of Teacher: Dr. Manisha Garg

Class – M.SC (F)

Session : 2022-23

Topics	Date	Remarks
Vorticity in two dimensions, Circular and rectilinear vortices, Vortex doublet, Images, Motion due to vortices, Single and double infinite rows of vortices. Karman vortex street. Wave motion in a Gas. Speed of sound in a gas. Equation of motion of a Gas. Subsonic, sonic and supersonic flows. Isentropic gas flow, Flow through a nozzle.	16-01-23 to 07-02-23	
Stress components in a real fluid. Relation between Cartesian components of stress. Transla- tional motion of fluid element. Rates of strain. Transformation of rates of strains. Relation between stresses and rates of strain. The co-efficient of viscosity and laminar flow. Newtonian and non-Newtonian fluids. Navier-Stoke equations of motion. Equations of motion in cylindrical and spherical polar co-ordinates. Equation of energy. Diffusion of vorticity. Energy dissipation due to viscosity. Equation of state..	08-02-23 to 01-03-23	
Plane Poiseuille and Couette flows between two parallel plates. Theory of lubrication. Hagen Poiseuille flow. Steady flow between co-axial circular cylinders and concentric rotating cylinders. Flow through tubes of uniform elliptic and equilateral triangular cross-section. Unsteady flow over a flat plate. Steady flow past a fixed sphere. Flow in convergent and divergent chennals.	02-03-23 to 02-04-23	
Dynamical similarity. Inspection analysis. Non-dimensional numbers. Dimensional analysis. Buckingham p-theorem and its application. Physical importance of non-dimensional parameters. Prandtl boundary layer. Boundary layer equation in two-dimensions. The boundary layer on a flat plate (Blasius solution). Characteristic boundary layer parameters. Karman integral conditions. Karman-Pohlhausen method	03-04-23 to onwards	