LESSON PLAN

Mathematics Department

G. C.Hisar

2023-24

B.A. & B.Sc.
Odd Semesters

CLASS:B.Sc./B.A.-I Year I Sem
NAME OF PAPER - ALGEBRA
PAPER CODE (for B.Sc.) - CML-106
PAPER CODE (for B. A.) - BAMH-101

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Symmetric, Skew-symmetric. Hermitian and Skew-Hermitian.Rank of a matrix. Inverse of a matrix. 2 Row rank andcolumn rank of a matrix. 3. Eigenvalues, eigenvectors and the characterstic equation of a matrix, Minimal polynomial of a matrix. 4 Cayley Hamilton theorem and its use in finding inverse of a matrix.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1. .Application of matrices to a system of linear (both homogenous and non-homogenous) equations. 2Theorems on consistency of a system of linear equations. 3. Unitary and Orthogonal MatricesBilinear and Quadratic forms 4..Cononical form of a Bilinear form. Matrix notation of bilinear and Quadratic Form
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**Relations between the roots and coefficients of general polynomial equation in one variable. **2**.Solution of polynomial equations having conditions on roots. **3.**Common roots and multiple roots. **4**.. Transformation of equations
4.	**4th**	**1st week** **2nd week** **3rd week** **&** **Last week**	1. Nature of the roots of an equation. 2.Solution of cubic equations (Cardan's method). 3.Biquadratic equations and their solutions,..Descarte's rule of signs, Ferrari 's Method. Descarte's rule of signs of polynomial.

CLASS:B.Sc./B.A.-I Year I Sem
NAME OF PAPER -CALCULUS
PAPER CODE (for B.Sc.) - CML-107
PAPER CODE (for B. A.) - BAMH-102

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.ε-δ definition of the limit of a function, Basic properties of limits, 2. Continuous functions and classification of discontinuities. 3. Successive differentiation. 4. Leibnitz theorem, Maclaurin and Taylor series expansions.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Asymptotes in Cartesian coordinates, Intersection of curve and its asymptotes..Asymptotes in polar coordinates, 2. Curvature, Radius of curvature for Cartesian curves, parametric curves, polar curves, 3. Tests for concavity and convexity, singular points, **4. .**, Point of inflexion, Multiple points, Cusps, nodes and conjugate points, species of cusps
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Tracing of curves in Cartesian, parametric and polar co-ordinates. **2.** Reduction formulae, .Derivation of Reduction formulae by connecting with other integral. 3. Rectification. 4. Length of curve in Cartesian,Parametric and polar curves.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Quadrature(area) Sectorial area. **2.** Area bounded by closed curves.Area enclosed by curves in polar form. **3.** .Volumes and Surfaces of solids of revolution. **4.** Volume bounded between two solids.

CLASS: B.Sc. Mathematics-I Year 1st Sem
NAME OF PAPER–Mathematics Lab-I (Practical)
PAPER CODE (for B.Sc.) - CMP-110
PAPER CODE (for B. A.) – BAMH (P)-103

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week & Last week**	**Part A:** Introduction to Programming in C Data types, Operators andexpressions, Input / outputs functions. Decisions control structure: Decision statements, Logical and conditional statements, Implementation of Loops-for, while, do while; Switch Statement & Case control structures. **Part B:** Following Program should be done as Practical:- 1. Program to interchange the value of two variables. 2. Program to calculate compound interest. 3. Program for testing a leap year.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	4. Program to find greatest of three numbers. 5. Program to calculate Gross salary of an employee. 6. Program to prepare electricity Bill. 7. Program to find roots of a quadratic equation.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	8. Program to provide output of a given function. 9. Program to display table of an input number 10. Program to find reverse of a number 11. Program to generate Fibonacci series.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	12. Program to check whether number is prime or not. 13. Program to generate first n prime numbers. 14. Program to check a number is Armstrong or not. 15. Program to convert a number to its binary equivalent.

CLASS:B.Sc./B.A.-II Year III Sem
NAME OF PAPER – ADVANCE CALCULUS
PAPER CODE (for B.Sc.) - CML-306
PAPER CODE (for B. A.) – BAMH-201

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chain rule ofdifferentiability. **2.** Mean value theorems; Rolle's Theorem and Lagrange's mean value theorem and theirgeometrical interpretations. **3.** Taylor's Theorem with various forms of remainders, Darboux intermediate valuetheorem for derivatives, **4.** Indeterminate forms.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1. Limit and continuity of real valued functions of two variables. Partial differentiation. 2. Total Differentials;Composite functions & implicit functions. **3.** Change of variables. Homogenous functions & Euler's theoremon homogeneous functions. **4.** Taylor's theorem for functions of two variables
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1. Differentiability of real valued functions of two variables. 2. Schwarz and Young's theorems. Implicitfunction theorem. 3. Maxima, Minima and saddle points of two variables. 4. Lagrange's method of multipliers .
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Jacobians, Beta and Gama functions, **2.** Double and Triple integrals, **3.** Dirichlets integrals, **4.** change of order ofintegration in double integrals..

CLASS:B.Sc./B.A.-II Year III Sem
NAME OF PAPER – NUMERICAL ANALYSIS
PAPER CODE (for B.Sc.) - CML-307
PAPER CODE (for B. A.) – BAMH-202

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Finite Difference operators and their relations, difference table, finding the missing terms and effect of errorin a difference tabular values, 2.Interpolation with equal intervals: derivations of Newton's forward andNewton's backward interpolation formulae and their applications, 3. Interpolation with unequal intervals: derivations of Newton's divided difference & 4.Lagrange's Interpolation formulae and their applications.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Central Difference interpolation formulae: derivations of Gauss's forward and Gauss's backwardinterpolation formulae, Sterling,Bessel formulae and their applications. 2.Numerical Differentiation: Relation between difference operator and derivative operator, 3.Derivative of a function using interpolation formulae (asstudied in Sections – I & II). 4. Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one- third rule and Simpson's three-eighth rule, Chebychev formula, Gauss Quadrature formula.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Secant method,Newton-Raphson's method, 2.Newton's iterative method for finding pth root of a number. 3.Simultaneous linearalgebraic equations: Gauss-elimination method, Gauss-Jordan method, triangularization method (LUdecomposition method). 4.Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	Eigen Value Problems: Power method, Jacobi's method, Given's method, House-Holder's method. Numerical solution of ordinary differential equations: Single step methods-Picard's method. Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta Methods. Multiple step methods; Predictorcorrector method, Milne-Simpson's method

CLASS: B.Sc. Mathematics-II Year 3rd Sem
NAME OF PAPER–Mathematics Lab-III (Practical)
PAPER CODE (for B.Sc.) - CMP-310
PAPER CODE (for B. A.) – BAMH (P)-203

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week** **3rd week & Last week**	1. To interpolate the data using Newton's forward interpolation formula 2. To interpolate the data using Newton's backward interpolation formula
2.	**2nd**	**1st week & 2nd week** **3rd week & Last week**	3. To interpolate the data using Gauss's forward interpolation formula 4. To interpolate the data using Gauss's backward interpolation formula
3.	**3rd**	**1st week & 2nd week** **3rd week** **Last week**	5. To interpolate the data using Lagrange's interpolation formula 6. To find the roots of algebraic and transcendental equations using Bisection method. 7. To find the roots of algebraic and transcendental equations using Regula-Falsi method.
4.	**4th**	**1st week & 2nd week** **3rd week & Last week**	8. To find the roots of algebraic and transcendental equations using Secant method. 9. To find the roots of algebraic and transcendental equations using Newton-Raphson's method. .

CLASS:B.Sc./B.A.-III Year V Sem
NAME OF PAPER – GROUPS AND RINGS
PAPER CODE (for B.Sc.) - CML-506(i)
PAPER CODE (for B. A.) – BAMH-301(i)

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Definition of a group.Example of abelian and non-abelian groups. The group $Z_n$of integers under addition modulo n and the group of (n) of units under multiplication modulo n. 2.Generator of a group. Cyclic groups. 3.Permutations groups. Alternating groups, Cayley's theorem. Subgroups and Subgroup criteria. 4.Cosets, Left and right cosets, properties of cosets.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1**Index of a sub-group. Coset decomposition, 2. Lagrange's theorem on groups and its consequences, Normal subgroups, Quotient groups, 3.Homomorphisms, isomorphisms, automorphisms on group. 4.Center of a group and class equation of a group and derived group of a group.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Introduction to Rings, Subrings, Integral domains and Fields, 2.Characteristics of a ring. Ring homomorphisms, Theorems on Ring homomorphisms. 3. Ideals (Principle, Prime and Maximal) and Quotient rings, 4.Field of quotients of an integral domain..
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Euclidean rings, Polynomial rings, Polynomials over the rational field, **2.** The Eisenstein's criterion of irreducibility of polynomials over the field of rational numbers **3.** Polynomial rings over commutative rings. Principal ideal domain, **4.** Unique factorization domain.

CLASS:B.Sc./B.A.-III Year V Sem
NAME OF PAPER – SEQUENCE AND SERIES
PAPER CODE (for B.Sc.) - CML-507(i)
PAPER CODE (for B. A.) – BAMH-302(i)

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week**	1.Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, neighborhoods, interior points, isolated points,
		2nd week	2.limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties.
		3rd week	3.Sequence: Real Sequences and their convergence, Theorem on limits of sequence, Bounded and monotonic sequences
		Last week	4.Cauchy's sequence, Cauchy general principle of convergence, sub sequence, subsequential limits.
2.	**2nd**	**1st week**	1.Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series,
		2nd week	2Cauchy's general principle of Convergence of series, Convergence and divergence of geometric series.
		3rd week	3.Hyper Harmonic series or p-series.Infinite series: D-Alembert's ratio test, Raabe's test, Logarithmic test,
		Last week	4.Cauchy's Nth root test, Gauss Test, Cauchy's Integral test, Cauchy's condensation test. Alternating series: Leibnitz's test, absolute and conditional convergence. Arbitrary series: Abel's lemma, Abel's test, Dirichlet's test.
3.	**3rd**	**1st week**	1.Fourier's series: Fourier expansion of piecewise monotonic functions.
		2nd week	2.Properties of Fourier Co-efficients, Dirichlet's conditions.
		3rd week	3. Parseval's identity for Fourier series.
		Last week	4.Fourier series for even and odd functions, Half range series, Change of Intervals.
4.	**4th**	**1st week**	1Riemann integral: Definition and examples. Darboux's Theorem and condition of existence of Riemann's integral.
		2nd week	2.Integrabililty of continuous, monotonic functions and discontinuous functions. Properties of integrable functions.
		3rd week	3.Continuity and differentiability of integrable functions. Primitive.
		Last week	4.The Fundamental theorem of integral calculus. Mean value theorems of integral calculus.

CLASS:B.Sc./B.A.-III Year V Sem

NAME OF PAPER – NUMBER THEORY AND TRIGONOMETRY

PAPER CODE (for B.Sc.) - CML-508(i)

PAPER CODE (for B. A.) – BAMH-303(i)

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1 Linear Diophantine equation, prime counting function, 2.statement of prime number theorem, Goldbach conjecture, 3 linear congruences, complete set of residues, 4.Chinese remainder theorem, Fermat's little theorem, Wilson's theorem
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Number theoretic functions, sum and number of divisors, totally multiplicative functions, 2.the Möbius inversion formula, the greatest integer function, 3.Euler's phi-function, Euler's theorem, 4.reduced set of residues, some properties of Euler's phi-function.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Order of an integer modulo n, primitive roots for primes, 2.composite numbers having primitive roots, Euler's criterion, 3.the Legendre symbol and its properties, quadratic reciprocity, 4.quadraticcongruences with composite moduli.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Exponential, Logarithmic, Circular functions; sin(nx), cos(nx), tan(nx), $\sin^n x$, $\cos^n x$, $\tan^n x$, 2.hyperbolic and inverse hyperbolic functions - simple problems. Gregory's series, 3.Summation of Trigonometric series, 4. Trigonometric expansions of sine and cosine as infinite products (without proof).

B.Com.

Odd Semesters

CLASS:B.Com. (General) and B.Com. (Honours)-I Year I Sem
NAME OF PAPER – BUSSINESS MATHEMATICS

PAPER CODE – BC-105

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Matrices and Determinants: concept of matrix, types, and algebra of matrices; properties of determinants; 2.calculation of values of determinants up to third order, adjoint of a matrix, elementary row or column operations; 3.Finding inverse of a matrix through adjoint and elementary row or column operations; 4.solution of a system of linear equations having unique solution and involving not more than three variables.
2.	**2nd**	**1st week** **2nd week** **3rd week** **&** **Last week**	1. Linear inequalities: 2. graphical solution of linear equalities in two variables, 3. solution of system of linear inequalities in two variables.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1. Linear programming-formulation of equation: 2. graphical method of solution; 3. problems relating to two variables including the case of mixed constraints; cases having no solution, 4. multiple solutions, unbounded solution and redundant constraints.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1. Logarithms and 2. Anti-logarithms, 3. Permutations and 4. Combinations.

B.Sc. (Hons)

Mathematics

Odd Semesters

CLASS:B.Sc.(Hons) Mathematics-I Year I Sem
AME OF PAPER – Mathematics-I Basic Algebra
PAPER CODE - BML-102

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Symmetric, Skew-symmetric, Hermitian and skew Hermitian matrices. Elementary operations on matrices. **2.** 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. **3.** Eigenvalues, eigenvectors and the characteristic equation of a matrix. Minimal polynomial of a matrix. **4.** Cayley Hamilton theorem and its use in finding the inverse of a matrix.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**Applications of matrices to a system of linear (both homogeneous and non–homogeneous) equations. 2. Theorems on consistency of a system of linear equations. 3.Unitary and Orthogonal Matrices, 4.Bilinear and Quadratic forms.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Relations between the roots and coefficients of general polynomial equation in one variable. 2.Solutions of polynomial equations having conditions on roots. 3.Common roots and multiple roots. 4.Transformation of equations.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1. Nature of the roots of an equation, 2. Descarte's rule of signs. 3. Solutions of cubic equations (Cardon's method). 4. Biquadratic equations and their solutions. .

CLASS:B.Sc.(Hons) Mathematics-II Year III Sem
NAME OF PAPER – Number Theory and Trigonometry
PAPER CODE - BML-301

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1 Divisibility, G.C.D.(greatest common divisors), L.C.M.(least common multiple) Primes, 2.Fundamental Theorem of Arithemetic. Linear Congruences, 3.Fermat's theorem. Wilson's theorem and its converse. 4.Linear Diophanatine equations in two variables .
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Complete residue system and reduced residue system modulo m. 2.Euler'sϕ function Euler's generalization of Fermat's theorem. Chinese Remainder Theorem. 3.Quadratic residues. Legendre symbols. Lemma of Gauss; Gauss reciprocity law. Greatest integer function [x]. 4.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.
3.	**3rd**	**1st week** **2nd week** **3rd week&** **Last week**	1.DeMoivre's Theorem and its Applications. 2.Expansion of trigonometrical functions. 3.Direct circular and hyperbolic functions and their properties.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Inverse circular and hyperbolic functions and their properties. 2.Logarithm of a complex quantity. 3.Gregory's series. 4. Summation of Trigonometry series.

CLASS:B.Sc.(Hons) Mathematics-II Year IIISem

NAME OF PAPER – Ordinary Differential Equations

PAPER CODE - BML-302

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week**	1.Geometrical meaning of a differential equation. Exact differential equations, integrating factors.
		2nd week	2.First order higher degree equations solvable for *x,y,p*
		3rd week	3.Lagrange's equations, Clairaut's equations.
		Last week	4.Equation reducible to Clairaut's form. Singular solutions.
2.	**2nd**	**1st week**	1.Orthogonal trajectories: in Cartesian coordinates and polar coordinates.
		2nd week	2.Self orthogonal family of curves. Linear differential equations with constant coefficients.
		3rd week	3.Homogeneous linear ordinary differential equations.
		Last week	4.Equations reducible to homogeneous
3.	**3rd**	**1st week**	1.Linear differential equations of second order: Reduction to normal form.
		2nd week	2.Transformation of the equation by changing the dependent variable/ the independent variable.
		3rd week	3.Solution by operators of non-homogeneous linear differential equations. Reduction of order of a differential equation.
		Last week	4. Method of variations of parameters. Method of undetermined coefficients.
4.	**4th**	**1st week**	1.Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators *(d/dx)* or *(d/dt)* etc.
		2nd week	2.Simultaneous equation of the form $dx/P = dy/Q = dz/R$.
		3rd week	3.Total differential equations. Condition for $Pdx + Qdy + Rdz = 0$ to be exact.
		Last week	4.General method of solving $Pdx + Qdy + Rdz = 0$ by taking one variable constant. Method of auxiliary equations.

CLASS:B.Sc.(Hons) Mathematics-II Year IIISem
NAME OF PAPER – Advanced Calculus
PAPER CODE - BML-303

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chain rule of differentiability. 2.Mean value theorems; Rolle's Theorem and Lagrange's mean value theorem and their geometrical interpretations. 3.Taylor's Theorem with various forms of remainders, 4.Darboux intermediate value theorem for derivatives, Indeterminate forms.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Limit and continuity of real valued functions of two variables. 2.Partial differentiation. Total Differentials; Composite functions & implicit functions. Change of variables. 3.Homogenous functions & Euler's theorem on homogeneous functions. 4.Taylor's theorem for functions of two variables
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Differentiability of real valued functions of two variables. 2.Schwarz and Young's theorems. Implicit function theorem. 3.Maxima, Minima and saddle points of two variables. 4. Lagrange's method of multipliers
4.	**4th**	**1st week** **2nd week** **3rd week & Last week**	1.Curves: Tangents, Principal normals, Binormals, Serret-Frenet formulae. Locus of the centre of curvature, 2.Spherical curvature, Locus of centre of Spherical curvature, 3.Involutes, evolutes, Bertrand Curves. Surfaces: Tangent planes, one parameter family of surfaces, Envelopes.

CLASS:B.Sc.(Hons) Mathematics-II Year IIISem

NAME OF PAPER – Vector Calculus

PAPER CODE - BML-304

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Scalar and vector product of three vectors, product of four vectors. Reciprocal vectors. 2.Vector differentiation. 3.Scalar Valued point functions, vector valued point functions, 4.derivative along a curve, directional derivatives
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Gradient of a scalar point function, geometrical interpretation of grad Φ , character of gradient as a point function. 2. Divergence and curl of vector point function, characters of Div $\vec{f}$ and Curl $\vec{f}$ as point function, examples. 3. Gradient, divergence and curl of sums and product and their related vector identities. 4.Laplacian operator.
3.	**3rd**	**1st week & 2nd week** **3rd week & Last week**	1.Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors. 2.Gradient, Divergence, Curl and Laplacian operators in terms of orthogonal curvilinear coordinates, Cylindrical co-ordinates and Spherical co-ordinates
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Vector integration; Line integral, 2.Surface integral, Volume integral. 3.Theorems of Gauss, Green & Stokes and 4.problems based on these theorems.

CLASS:B.Sc.(Hons) Mathematics-II Year IIISem
NAME OF PAPER – Mathematical Statistics
PAPER CODE - BML-305

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Measures of Central Tendency and Location: Mean, median, mode, geometric mean, harmonic mean, partition values. 2.Measures of Dispersion:Absolute and relative measures of range, quartile deviation, 3.mean deviation, 4.standard deviation (σ), coefficient of variation.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Moments, Skewness and Kurtosis: 2.Moments about mean and about any point and derivation of their relationships, effect of change of origin and scale on moments, 3.Sheppard's correction for moments (without derivation), Charlier's checks, 4.Concepts of Skewness and Kurtosis.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Basic concepts in Probability,Bayes' theorem and its applications. 2.Random Variable and Probability Functions: **3.**Definition and properties of random variables, discrete and continuous random variable, 4.Probability mass and density functions, distribution function.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Correlation for Bivariate Data: Concept and types of correlation, Scatter diagram, 2.Karl Pearson Coefficient (r) of correlation and rank correlation coefficient. 3.Linear Regression: Concept of regression, principle of least squares and fitting of straight line, derivation of two lines of regression, properties of regression coefficients, standard error of estimate obtained from regression line, 4.correlation coefficient between observed and estimated values. Angle between two lines of regression. Difference between correlation and regression.

CLASS:B.Sc.(Hons) Mathematics-II Year IIISem
NAME OF PAPER – Special Functions-I

PAPER CODE - BML-306

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week 3rd week & Last week**	1.Series solution of differential equations – Power series method, 2.Definitions of Beta and Gamma functions.
2.	**2nd**	**1st week & 2nd week 3rd week & Last week**	1.Bessel equation and its solution: Bessel functions and their properties 2Convergence, recurrence relations and generating functions, Orthogonality of Bessel functions
3.	**3rd**	**1st week & 2nd week 3rd week & Last week**	1.Legendre and Hermite differentials equations and their solutions: 2.Legendre and Hermite functions and their properties-Recurrence Relations and generating functions..
4.	**4th**	**1st week & 2nd week 3rd week & Last week**	1.Orhogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre &Hermite Polynomials, 2.Laplace Integral Representation of Legendre polynomial

CLASS: B.Sc.(Hons) Mathematics-III Year V Sem
NAME OF PAPER – Real Analysis
PAPER CODE - BML-501

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Riemann integral, 2.Integrability of continuous and monotonic functions, 3. The Fundamental theorem of integral calculus. 4. Mean value theorems of integral calculus.
2.	**2nd**	**1st week** **2nd week** **3rd week** **&** **Last week**	1.Improper integrals and their convergence, Comparison tests, 2.Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter. 3.Continuity, Differentiability and integrability of an integral of a function of a parameter.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets, 2. closure and interior, boundary points, subspace of a metric space, equivalent metrics, 3.Cauchy sequences, completeness, Cantor's intersection theorem, 4.Baire's category theorem, contraction Principle
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Continuous functions, uniform continuity, compactness for metric spaces, 2. sequentialcompactness, Bolzano-Weierstrass property, 3.total boundedness, finite intersection property,continuity in relation with compactness, 4.connectedness , components, continuity in relation with connectedness.

CLASS: B.Sc.(Hons) Mathematics-III Year V Sem
NAME OF PAPER – Groups and Rings
PAPER CODE - BML-502

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Definition of a group with example and simple properties of groups, 2. Subgroups and Subgroup criteria, Generation of groups, cyclic groups, 3.Cosets, Left and right cosets, Index of a sub-group Coset decomposition, 4. Largrage's theorem and its consequences, Normal subgroups, Quotient groups,
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1. Homoomorphisms, isomophisms, automorphisms and 2.inner automorphisms of a group. Automorphisms of cyclic groups, 3. Permutations groups. Even and odd permutations.Alternating groups, Cayley's theorem, 4. Center of a group and derived group of a group.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Introduction to rings, subrings, integral domains and fields, 2.Characteristics of a ring. Ring homomorphisms, 3. ideals (principle, prime and Maximal) and Quotient rings, 4.Field of quotients of an integral domain.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Euclidean rings, 2.Polynomial rings, Polynomials over the rational field, The Eisenstein's criterion, 3.Polynomial rings over commutative rings, 4.Unique factorization domain, R unique factorization domain implies so is *R[X1 , X2,……Xn]*

CLASS: B.Sc.(Hons) Mathematics-III Year V Sem
NAME OF PAPER – Programming in C & Numerical Methods
PAPER CODE - BML-503

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week**	1.Programmer's model of a computer, Algorithms, Flow charts, Data types,
		3rd week & Last week	2.Operators and expressions, Input / Output functions.
2.	**2nd**	**1st week**	1.Decisions control structure: Decision statements,
		2nd week	2.Logical and conditional statements, Implementation of Loops,
		3rd week	3.Switch Statement & Case control structures.
		Last week	4.Functions, Preprocessors and Arrays.
3.	**3rd**	**1st week**	1.Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters.
		2nd week	2.Structures: Definition, using Structures, use of Structures in Arrays and Arrays in Structures. Pointers:
		3rd week	3.Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Secant method,
		Last week	4.Newton-Raphson's method. Newton's iterative method for finding pth root of a number.
4.	**4th**	**1st week & 2nd week**	1.Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Triangularization method (LU decomposition method). Crout's method,
		3rd week & Last week	2.Cholesky Decomposition method. Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.

CLASS: B.Sc.(Hons) Mathematics-III Year V Sem

NAME OF PAPER – Programming in C & Numerical Methods-Lab

PRACITAL

PAPER CODE - BMP-504

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	1st week & 2nd week 3rd week & Last week	Programming in C 1. Generates first n prime numbers. 2. Calculate compound interest. 3. Solve a quadratic equation. 4. Swap two numbers using pointers. 5. Pattern matching of two strings.
2.	**2nd**	1st week 2nd week 3rd week Last week	6. Count number of vowels and consonants in a sentence. 7. Reverse a string character by character and word by word. 8. Encryption and decryption of a string. 9. Find GCD of two integers and use it to find the GCD of three integers using functions.
3.	**3rd**	1st week & 2nd week 3rd week & Last week	10.Secant Method. 11. Regula-Falsi Method. 12. Bisection Method. 13. Newton- Raphson Method. 14. Jacobi- Method.
4.	**4th**	1st week 2nd week 3rd week Last week	15. Gauss Elimination Method . 16. Gauss Seidel Method . 17. Gauss Jordan Method . 18. Crout's Method.

CLASS: B.Sc.(Hons) Mathematics-III Year V Sem

NAME OF PAPER – Sequence and Series

PAPER CODE - BML-505

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, 2.neighborhoods, interior points, isolated points, limit points, 3.open sets, closed set, interior of a set, closure of a set in real numbers and their properties. Bolzano- 4.Weiestrass theorem, Open covers, Compact sets and Heine-Borel Theorem.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Sequence: Real Sequences and their convergence, Theorem on limits of sequence, Bounded and monotonic sequences, 2.Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Subsequential limits. 3.Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series, 4.Convergence and divergence of geometric series, Hyper Harmonic series or p-series.
3.	**3rd**	**1st week & 2nd week** **3rd week & Last week**	1.Infinite series: D-Alembert's ratio test, Raabe's test, Logarithmic test, de Morgan and 2.Bertrand's test, Cauchy's nth root test, Gauss Test, Cauchy's integral test, Cauchy's condensation test.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Alternating series, Leibnitz's test, absolute and conditional convergence, 2.Arbitrary series: abel's lemma, Abel's test, Dirichlet's test, Insertion and removal of parenthesis, rearrangement of terms in a series, Dirichlet's theorem, 3.Riemann's Re-arrangement theorem, Pringsheim's theorem (statement only), Multiplication of series, 4.Cauchy product of series, (definitions and examples only) Convergence and absolute convergence of infinite products.

CLASS: B.Sc.(Hons) Mathematics-III Year V Sem
NAME OF PAPER – Operations Research -II
PAPER CODE - BML-506

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Inventory Control: introduction of inventory, factors affecting inventory, 2.Inventory models, Deterministic models: 3.Economic order quantity model when shortages are allowed/not allowed, 4. price discounts model, multi-item inventory models.
2.	**2nd**	**1st week & 2nd week** **3rd week & Last week**	1.Queuing Theory : Basic characteristics of queuing system, Birth-death equations, 2.Steady state solution of Markovian queuing models with single and multiple servers with infinite capacity (M/M/1 and M/M/c), and with limited capacity (M/M/1/K and M/M/c/K).
3.	**3rd**	**1st week & 2nd week** **3rd week** **Last week**	1.Sequencing problems: Processing of n jobs through 2 machines, n jobs through 3 machines, 2 jobs through m machines, n jobs through m machines. 2.Replacement problems: Replacement of items whose running cost increases with time, 4.Replacement policies for the items that fail completely - Individual and the group replacement policies.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.PERT and CPM: Introduction of PERT and CPM, 2.Earliest and latest times, 3.Determination of critical path and various types of floats, 4.Probablistic and cost considerations in project scheduling

M.Sc.

Mathematics

Odd Semesters

CLASS: M.Sc. Mathematics-I Year I Sem
NAME OF PAPER–Algebra
PAPER CODE -MAL-511

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Zassenhaus's lemma, Normal and Subnormal series. Scheiers Theorem, 2.Composition Series. Jordan-Holder theorem. 3.Commutators and their properties. 4.Three subgroup lemma of P.Hall.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Central series. Nilpotent groups. 2.Upper and lower central series and their properties. Invariant (normal) and chief series. 3.Solvable groups. Derived series. 4.Field theory. Prime fields.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Extension fields. Algebraic and transcendental extensions. 2.Algebraically closed field. Conjugate elements. Normal extensions. 3Separable and inseparable extensions. 4.Perfect fields. Construction with ruler and campass. Finite fields
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Roots of unity. Cyclotomic Polynomial in □n (x). 2.Primitive elements. Automorphisms of extensions. 3.Galois extension. Fundamental theorem of Galois theory. 4.Solutions of polynomial equations by radicals. Insolvability of the general equation of degree 5 by radicals.

CLASS:M.Sc. Mathematics-I Year I Sem
NAME OF PAPER –Real Analysis
PAPER CODE -MAL-512

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week** **3rd week & Last week**	1.Definition and existence of Riemann-Stieltjes integral, properties of the integral, integration and differentiation, 2.the fundamental theorem of Calculus, integration of vector-valued functions, rectifiable curves
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Sequences and series of functions, point-wise and uniform convergence, Cauchy criterion for uniform convergence, 2.Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, uniform convergence and continuity, 3.uniform convergence and Riemann-Stieltjes integration, uniform convergence and differentiation, 4.Weierstrass approximation theorem, Power series, uniqueness theorem for power series, Abel's theorems.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Functions of several variables, linear transformations, derivatives in an open subset of R□, chain rule, 2.partial derivatives, interchange of the order of differentiation, derivatives of higher orders, 3.Taylor's theorem, Inverse function theorem, Implicit function theorem, 4.Jacobians, extremum problems with constraints, Lagrange's multiplier method.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Set functions, intuitive idea of measure, elementary properties of measure, 2.measurable sets and their fundamental properties, 3.Lebesgue measure of sets of real numbers, algebra of measurable sets, 4.Borel sets, equivalent formulation of measurable sets in terms of open, closed, *F*□ and G□ sets, non measurable sets.

CLASS:M.Sc. Mathematics-I Year I Sem
NAME OF PAPER –Mechanics
PAPER CODE -MAL-513

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week** **3rd week** **Last week**	1.Moments and products of Inertia, Theorems of parallel and perpendicular axes, principal axes, 2.Themomental ellipsoid, Equimomental systems, Coplanar distributions. Generalized cooordinates. 3.Holonomic and Non-holonomic systems. Scleronomic and Rheonomic systems. 4.Lagrange's equations for a holonomic system.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Lagrange's equations for a conservative and impulsive forces. Kinetic energy as quadratic function of velocities. 2.Generalized potential, Energy equation for conservative fields.Hamilton's variables. Donkin's theorem. 3.Hamilton canonical equations. Cyclic coordinates. Routh's equations. 4. Poisson's Bracket. Poisson's Identity. Jacobi-Poisson Theorem.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Hamilton's Principle. Principle of least action. Poincare Cartan Integral invariant. Whittaker's equations. 2.Jacobi's equations. Hamilton-Jacobi equation. Jacobi theorem. Method of separation of variables. Lagrange Brackets. 3.Condition of canonical character of a transformation in terms of Lagrange brackets and Poisson brackets. 4.Invariance of Lagrange brackets and Poisson brackets under canonical transformations.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Gravitation: Attraction and potential of rod, disc, spherical shells and sphere. 2.Laplace and Poisson equations. Work done by self-attracting systems. 3.Distributions for a given potential. Equipotential surfaces. 4.Surface and solid harmonics. Surface density in terms of surface harmonics.

CLASS:M.Sc. Mathematics-I Year I Sem
NAME OF PAPER –Ordinary Differential Equation-I
PAPER CODE -MAL-514

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2ndweek** **3rd week** **Last week**	1.Initial-value problem and the equivalent integral equation, E-approximate solution, Cauchy-Euler construction of an ε-approximate solution, 2.Equicontinuous family of functions, Ascoli-Arzela theorem, Cauchy-Peano existence theorem. 3.Uniqueness of solutions, Lipschitz condition, 4.Picard-Lindelof theorem for local existence and uniqueness of solutions, solution of initial-value problems by Picard method.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Approximate methods of solving first-order equations: Power Series Methods, Numerical Methods. 2 Continuation of solutions, Maximum interval of existence, 3.Extension theorem, Dependence of solutions on initial conditions and function. 4. Matrix method for homogeneous first order systems, nth order equation
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Total differential equations: Condition of integrability, 2.Methods of Solution. 3.Gronwall's differential inequality, 4.comparison theorems involving differential inequalities.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Zeros of solutions, Sturms separation and comparison theorems. 2.Oscillatory and nonoscillatory equations, Riccati's equation and its solution, 3.Pruffer transformation, Lagrange's identity and Green's formula for second-order equation, 4. Sturm-Liouville boundary-value problems, properties of eigen values and eigen functions.

CLASS:M.Sc. Mathematics-I Year I Sem
NAME OF PAPER –Complex Analysis-I
PAPER CODE -MAL-515

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Cauchy Riemann Equations, Analytic functions, Reflection principle, 2.Complex Integration, Antiderivatives, 3.Cauchy-Goursat Theorem, Simply and Multiply connected domains, 4.Cauchy's Integral formula, Higher Order derivatives,
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Morera's theorem, Cauchy's inequality, 2.Liouville's theorem, The fundamental theorem of Algebra, 3.Maximum Modulus Principle, Schwarz lemma, 4.Poisson's formula, Taylor's Series, Laurent's Series.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Isolated Singularities, Meromorphic functions, 2.Argument principle, Rouche's theorem, 3.Residues, Cauchy's residue theorem, 4.Evaluation of Integrals, MittagLeffler's expansion theorem.
4.	**4th**	**1st week** **2nd week** **3rd week** **&** **Last week**	1.Branches of many valued functions with special reference to arg z, Log z, z_a. 2. Bilinear transformations, their properties and 3.classification, definition and examples of conformal mapping.

CLASS:M.Sc. Mathematics-I Year I Sem
NAME OF PAPER –PROGRAMMING WITH FORTRAN (THEORY)
PAPER CODE -MAL-516

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.Computer Programming in Fortran 90/95**: Numerical constants and variables, arithmetic expressions; implicit declaration, named constants, input/output; 2.List directed input/output statements, 3.Format specifications. Declarations including KIND specifications, 4.Use of complex variables, Pointers
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1 Logical expressions and control flow; conditional flow; IF structure, Block DO loop Counted controlled Loops. 2.arrays; input/output of arrays, arrays with variable size using ALLOCATABLE statement, 3.arrays handling functions, 4. multidimensional arrays
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Strings, declaration of character variables, 2. character handling functions, operators on strings, 3.Subprograms, Types of Subprograms, Significance Functions; subroutines; 4. Procedures with array arguments, Recursion
4.	**4th**	**1st week** **2nd week** **3rd week** **&Last week**	1.Derived types, Elements of derived type, arrays and derived type 2.Processing files, Sequential file, 3. Direct Access file; creating and closing a file and 4.Accessing elements using pointers with example

CLASS:M.Sc. Mathematics-II Year IIISem
NAME OF PAPER –TOPOLOGY
PAPER CODE -MAL-631

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Definition and examples of topological spaces. Closed sets. Closure .2. Dense subsets.Neighbourhoods. Interior, exterior and boundary points of a set. Accumulation points andderived sets. 3.Bases and sub-bases. Subspaces and relative topology. Alternate methods ofdefining a topology in terms of Kuratowski Closure Operator and Neighbourhood Systems. 4.Continuous functions and homeomorphism**.**
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Compactness. Continuous functions and compact sets. 2.Basic properties of compactness. Compactness and finite intersection property. Sequentially and countably compact sets. 3. Local compactness and one point compactification. 4.Compactness in metric spaces. Equivalence of compactness, countable compactness and sequential compactness in metric spaces.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Connected spaces. Connectedness on the real line. Components 2. Locally connectedspaces. First and Second Countable spaces. 3.Lindelof 's theorem. Separable spaces. Second Countability and Separability. 4.Separation axioms. T0, T1, and T2 spaces. Their characterizationand basic properties.
4.	**4th**	**1st week** **2nd week** **3rd week &Last week**	1.Regular and normal spaces. Urysohn's Lemma. T3 and T4 spaces. 2.Complete regularityand Complete normality. T3/1⁄2 and T5 spaces. 3.Product topological spaces, Projection mapping. 4.Tychonoff product topology in terms of standard sub-base and its characterizations.

CLASS:M.Sc. Mathematics-II Year IIISem
NAME OF PAPER– PARTIAL DIFFERENTIAL EQUATIONS
PAPER CODE -MAL-632

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1Solution of Partial Differential Equations Transport Equation-Initial value Problem. 2.Non-homogeneous Equation. Laplace's Equation- 3.Fundamental Solution, Mean Value Formulas,Properties of Harmonic Functions, 4.Green's Function, Energy Methods..
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Wave Equation-Solution by Spherical Means, Non-homogeneous Equations, 2.Energy Methods.Poisson's formula, 3.Kirchoff's formula,D. Alembert's formula, 4.Uniqueness of Solution Domainof Dependence of Solution.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Heat Equation-Fundamental Solution, Solution of initial value problem, Non Homogeneous Equation, 2.Mean Value Formula. Nonlinear First Order PDE-Complete Integrals, 3.Envelopes, Characteristics, Hamilton-Jacobi Equations, 4. Hamilton's ODE, Hopf-Lax Formula, Weak Solutions, Uniqueness.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Representation of Solutions-Separation of Variables, Similarity Solutions (Plane and Travelling 2.Waves, Solitons, Similarity under Scaling), 3.Fourier and Laplace Transform, Hopf-Cole Transofrm, 4.Hodograph and Legendre Transforms, Potential Functions. .

CLASS:M.Sc. Mathematics-II Year IIISem
NAME OF PAPER –MECHANICS OF SOLIDS-I
PAPER CODE -MAL-633

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week**	1.Cartesian Tensor: Coordinate transformation, Cartesian Tensor of different order,.Sumor difference and product of two tensors.
		2nd week	2. Contraction theorem, Quotient law, Symmetric &Skewsymmetric tensors, Kronecker tensor,
		3rd week	3. Alternate tensor and relation between them, Scalarinvariant of second order tensor,
		Last week	4.Eigen values & vectors of a symmetric second order tensor,Gradient, divergence & curl of a tensor field.
2.	**2nd**	**1st week**	**1.**Analysis of Strain: Affine transformations. Infinitesimal affine deformation
		2nd week	2. Geometricalinterpretation of the components of strain. Strain quadric of Cauchy.Principal strains andinvariants.
		3rd week	3.General infinitesimal deformation.Saint- Venant' s equations of Compatibility.
		Last week	4Analysis of Stress: Stress tensor.Equations of equilibrium. Transformation ofcoordinates.
3.	**3rd**	**1st week**	1.Stress quadric of Cauchy. Principal stress and invariants.
		2nd week	2.Maximum normal and shearStresses
		3rd week	3.Equations of Elasticity: Generalised Hooke's law.
		Last week	4.Homogeneous isotropic media.
4.	**4th**	**1st week**	1.Elastic moduli for isotropic media,
		2nd week	2.Equilibrium and dynamic equations for an isotropicelastic solid.
		3rd week	3.Strain energy function and its connection with Hooke's law.
		Last week	4.BeItrami-MicheIlcompatibility equations. Saint-Venant' s principle..

CLASS:M.Sc. Mathematics-II Year IIISem
NAME OF PAPER –Computing Lab-II (MATLAB Programming & Applications)
PAPER CODE -MAL-634

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.User-Defined Functions and Function Files: Main Features of a Function file, Saving aFunction File, Using a User-Defined Function, 2.Comparison between Script Files and Function Files, Anonymous and Inline Functions: Anonymous Functions, Inline Functions. 3.Functions:Using Function Handles for Passing a Function into a Function, Using a Function Name for Passing a Function into a Function. 4.Subfunctions, Nested Functions..
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Polynomials: Value of a Polynomial, Roots of a Polynomial, Addition, Multiplication and Division of Polynomials, 2.Derivatives of Polynomials. Curve Fitting with Polynomials, The polyfit Function, Curve Fitting with Functions other than Polynomials. 3.Applications in Numerical Analysis: Solution of an Equation with one Variable, Minimum or a Maximum of a Function, 4.Numerical Integration, Ordinary Differential Equations.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Three Dimensional Plots: Line Plots, Mesh and Surface Plots, Plots with Special Graphics, 2.The View Command.Symbolic Math: Solving Algebraic Equations, 3.Differentiation, Integration, Solving an OrdinaryDifferential Equation, Plotting Symbolic Expressions, 4.Numerical Calculations with Symbolic Expressions.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Numerical Methods - Interpolation : Lagrange′s interpolation formula, 2.Newton Gregoryforward interpolation formula, Newton Gregory backward interpolation formula. 3.Solution of asystem of Linear Equations: (Unique solution case only) :Gauss – Elimination Method, Gauss – Jordan Method. 4.Solution of Ordinary Differential Equations: Euler's Method,Euler′s Modified Method , RungeKutta Second and Fourth order Method..

CLASS:M.Sc. Mathematics-II Year IIISem
NAME OF PAPER –FLUID MECHANICS
PAPER CODE -MAL-636

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2ndweek** **3rd week** **Last week**	1.Basics of Fluid Kinematics: General consideration of fluid, Lagrangian and Eulerian approach, 2.Substantial derivative, Stream lines, Path lines, Streak lines, Divergence of a flow field, 3.Translation, deformation and rotation of fluid element, Irrotational and rotational motions. Vortex lines, Reynolds Transport Theorem, 4.Equation of Continuity. Euler's equation of motion, Bernoulli's theorem, Kelvin's circulation theorem, Vorticity equation. .
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Energy equation for an incompressible flow. 2.Boundary conditions, Kinetic energy of liquid, 3.Axially symmetric flows, Motion of a sphere through a liquid at rest at infinity, 4.Liquid streaming past a fixed sphere, force on a sphere, Equation of motion of a sphere.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1Vorticity and Rotation, The Velocity potential φ, Stream functions ψ, Stokes stream functions. 2.Uniform flow, Sources, Sinks and doublets, Images in a rigid impermeable infinite plane and in impermeable spherical surfaces, 3.Conformal mapping, Milne-Thomson Circle theorem,Application to fluid mechanics, 4.Blasius theorem, Joukovskii transformation, JoukovskiiAerofoils
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1Two-dimensional irrotational motion produced by motion of circular, 2.co-axial andelliptic cylinders in an infinite mass of liquid, 3. Vortex motion and its elementary properties, 4.Kelvin's proof of permanence, motion due to rectilinear vortices.. .

CLASS:M.Sc. Mathematics-II Year IIISem
NAME OF PAPER –ADVANCED DISCRETE MATHEMATICS
PAPER CODE -MAL-637

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Formal Logic - Statements, Symbolic, Representation and Tautologies, Quantifiers, PropositionLogic. 2. Lattices - Lattices as partially ordered sets, Their properties, Lattices as Algebraicsystems, 3. Some special Lattices, e.g., complete, complemented and Distributive Lattices. Sets 4.Some Special Lattices e.g., Bounded, Complemented & Distributive Lattices.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Boolean Algebra - Boolean Algebra as Lattices, Various Boolean Identities, The Switching Algebra example, Join - irreducible elements, 2. Atoms and Minterms, Boolean Forms and Their Equivalence, Minterm Boolean Forms, 3. Sum of Products canonical Forms, Minimization ofBoolean Functions, 4. Applications of Boolean Algebra to Switching Theory (using AND, OR andNOT gates).
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	Graph Theory - Definition of Graphs, Paths, Circuits, Cycles and Subgraphs, InducedSubgraphs, 2. Degree of a vertex, Connectivity, Planar Graphs and their properties, 3.Euler'sFormula for Connected Planar Graph, 4.Complete and Complete Bipartite Graphs,
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Trees, Spanning Trees, Minimal Spanning Trees, Matrix Representation of Graphs, 2.Euler's theorem on the Existence of Eulerian Paths and circuits, 3.Directed Graphs, Indegree andoutdegree of a vertex, Weighted undirected Graphs, 4.Strong Connectivity and Warshall'sAlgorithm, Directed Trees, Search Trees, Tree Traversals.

B.A. & B.Sc.

Even Semesters

CLASS: B.Sc./B.A. -I Year II Sem

NAME OF PAPER - Ordinary Diff. Eqn. & Laplace Transform

PAPER CODE(for B.Sc) -CML-206

PAPER CODE(for B.A.) - BAMH-104

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Geometrical meaning of a differential equation. Exact differential equations, integrating factors. **2**. First order higher degree equations solvable for x,y,p Lagrange's equations, **3** Clairaut's equations. Equation reducible to Clairaut's form. **4**. Singular solutions.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1**Orthogonal trajectories: in Cartesian coordinates and polar coordinates. **2** Self orthogonal family of curves.. Linear differential equations with constant coefficients. **3** Homogeneous linear ordinary differential equations. **4** Equations reducible to homogeneous
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Linear differential equations of second order: **2.** Reduction to normal form. **3.** Transformation of the equation by changing the dependent variable/ the independent variable. **4.** Method of variations of parameters.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Laplace Transforms – Existence theorem for Laplace transforms, Linear property of the Laplace transforms, Shifting theorems, **2.**Laplace transforms of derivatives and integrals, 3. Inverse Laplace transforms, convolution theorem, **4.**solution of ordinary differential equations using Laplace transform.

CLASS: B.Sc./B.A. -I Year II Sem

NAME OF PAPER – VECTOR CALCULUS AND GEOMETRY

PAPER CODE(for B.Sc.) -CML-207

PAPER CODE(for B.A.) - BAMH-105

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Scalar and vector product of three vectors, derivative along a curve, directional derivatives. **2.** Gradient of a scalar point function.Geometrical interpretation of grad ϕ , 3.Divergence and curl of a vector point function. Gradient, divergence and curl of sums and product and their related vector identities. 4. Laplacian operators.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.** Line integral, surface integral, volume integral **2.** Gauss divergence theorem, Divergence theorem in Cartesian coordinates **3.** Green theorem, Stoke's theorem (relation between line and surface integral) Stoke's theorem in Cartesian form. **4.** Green's Theorem in plane as special case of Stoke's Theorem
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.General equation of second degree, 2 Tracing of conics.System of conics **3** Tangent at any point to the conic,Director circle of conic, 4.tangent and normal to the conic.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	Sphere : plane section of a sphere. Sphere through a given circle. 2. Intersection of two spheres. Co-axial system of spheres. 3. Cones: Right circular cone, enveloping cone and reciprocal cone. 4.Cylinder: Right circular cylinder and enveloping cylinder

CLASS: B.Sc. Mathematics-I Year 2nd Sem

NAME OF PAPER–Mathematics Lab-II (Practical)

PAPER CODE (for B.Sc.) - CMP-210

PAPER CODE (for B. A.) – BAMH (P)-106

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week** **3rd week & Last week**	**Part A: Introduction to Programming in C** Strings: Character data type, Standard string handling functions, arithmetic operations on characters. Structures: definition, using structures, use of structures in arrays and arrays in structures, Functions.
2.	**2nd**	 **1st week** **2nd week** **3rd week** **Last week**	**Part B:** Following Program should be done as Practical:- 16. Program to add two matrices. 17. Program to multiply two matrices. 18. Program to find the inverse of a matrix. 19. Program to find transpose of a matrix.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	20. Program to find the sum of a series. 21. Program to sort an entire array using bubble short. 22. Program to find trace of 3X3 Matrix. 23. Program to find largest of three numbers using function.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	24. Program to find factorial of a number using recursion. 25. Program to generate n Fibonacci terms using recursion. 26. Program to count number of vowels and consonants in a given sentence. 27. Program to print a salary chart for employee of a company.

CLASS: B.Sc./B.A. - II Year IV Sem

NAME OF PAPER – Partial Differential Equations & Special Functions

PAPER CODE(for B.Sc) -CML-406

PAPER CODE(for B.A.) - BAMH-204

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	1st week 2nd week 3rd week Last week	**1.**Partial differential equations: Formation, order and degree. **2.**Linear and non-linear partial differential equations of the first order: Complete solution. **3.**Singular solution, General solution, Solution of Lagrange's linear equations. **4.**Charpit's general method of solution, Compatible systems of first order equations, Jacobi's method.
2.	**2nd**	1st week 2nd week 3rd week Last week	1.Linear partial differential equations of second and higher orders, Linear and non-linear homogeneous and nonhomogeneousequations with constant coefficients, 2.Partial differential equation with variable coefficientsreducible to equations with constant coefficients, their complimentary functions and particular integrals, 3.Equations reducible to linear equations with constant coefficients. 4.Method of separation of variables: Solution of Laplace's equation, Wave equation (one and two dimensions), Diffusion (Heat) equation (one and two dimension) in Cartesian Co-ordinate system.
3.	**3rd**	1st week 2nd week 3rd week Last week	1.Classification of linear partial differential equations of second order, hyperbolic, parabolic and elliptic types, 2. Reduction of second order linear partial differential equations to Canonical (Normal) forms and their solutions, 3.Solution of linear hyperbolic equations, Monge's method for partial differential equations of second order,Cauchy's problem for second order partial differential equations, 4.Characteristic equations and characteristic curves of second order partial differential equation.
4.	**4th**	1st week 2nd week 3rd week Last week	1.Series solution of differential equations – Power series method. 2.Bessel equation and its solution: Besselfunctions 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 forLegendre Polynomial

CLASS: B.Sc./B.A. - II Year IV Sem

NAME OF PAPER – MECHANICS-I

PAPER CODE(for B.Sc) -CML-407

PAPER CODE(for B.A.) - BAMH-205

SR. NO	MONTHS	PERIOD	TOPICS
1.	**1st**	1st week 2nd week 3rd 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, resultant and centre of parallel forces; 4.Moments and Couples.
2.	**2nd**	1st week 2nd week 3rd week Last week	1.Forces in three dimensions, Poinsot'scentral axis, 2. Conditions for the reduction of a general system of forces in space to a single force, equations of central axis, 3.Wrenches: Definition and basic laws, resultant wrench of two wrenches, locus of the central axis of two wrenches, 4.; Null lines and null planes
3.	**3rd**	1st week 2nd week 3rd week Last week	1.Velocity and acceleration along a plane curve, 2.component of velocity and acceleration in radial, transverse,tangential and normal directions, 3.Relative velocity and acceleration. 4. Simple harmonic motion (SHM).
4.	**4th**	1st week 2nd week 3rd week Last week	1.Newton's laws of motion, Central Orbits, differential equations of Central Orbits in polar form and in pedalform, 2. areal velocity, elliptic, hyperbolic and parabolic orbit, velocity in a circle, apse and apsidal distances: definition and laws, velocity from infinity, 3.Kepler's laws of planetary motion, equivalence of Kepler's laws of planetary motion and 4.Newton's law of gravitation, motion under the inverse square law.

CLASS: B.Sc. Mathematics-II Year 4th Sem

NAME OF PAPER–Mathematics Lab-IV (Practical)

PAPER CODE (for B.Sc.) - CMP-410

PAPER CODE (for B. A.) – BAMH (P)-206

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week** **3rd week & Last week**	**Write down and execute the following programs using C-Programming Language** 1. To solve the system of linear equations using Gauss -elimination method. 2. To solve the system of linear equations using Gauss -Seidal iteration method.
2.	**2nd**	**1st week & 2nd week** **3rd week & Last week**	3. To solve the system of linear equation using Gauss –jordan method. 4. To find the largest eigen value of a matrix by Power -method.
3.	**3rd**	**1st week & 2nd week** **3rd week & Last week**	5. To integrate numerically using Trapezoidal rule. 6. To integrate numerically using Simpson's one-third rule. 7. To integrate numerically using Simpson's three-eighth rule.
4.	**4th**	**1st week & 2nd week** **3rd week & Last week**	8. To find numerical solution of ordinary differential equations by Euler's method/ Modified Euler's method. 9. To find numerical solution of ordinary differential equations by Runge -Kutta method.

CLASS: B.Sc./ B.A. III Year VI Sem
NAME OF PAPER - LINEAR ALGEBRA
PAPER CODE (for B.Sc.) – CML-605(i)
PAPER CODE (for B.A.) –BAMH-304(i)

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	1st week 2nd week 3rd week Last week	**1.** Vector spaces, subspaces, **2.**Sum and Direct sum of subspaces, **3.** Linear span, Linearly Independent and dependent subsets of a vector space. **4.** Finitely generated vector space, Existence theorem for basis of a finitely generated vactor space,
2.	**2nd**	1st week 2nd week 3rd week Last week	**1**. Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, **2**. Quotient space and its dimension Homomorphism and isomorphism of vector spaces, **3**. Linear transformations and linear forms on vactor spaces, Vactor space of all the linear transformations **4.**Null Space, Range space of a linear transformation, Rank and Nullity Theorem
3.	**3rd**	1st week 2nd week 3rd week Last week	**1.** Algebra of Liner Transformation **2.** Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, **3.** Matrix of a linear Transformation, Change of basis. 4.Eigen values and Eigen vectors of linear transformations
4.	**4th**	1st week 2nd week 3rd week Last week	**1.** Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, 2.Orthogonal complements, Orthogonal sets and Basis, **3.** Bessel's inequality for finite dimensional vector spaces, 4.Gram-Schmidt, Orthogonalizationprocess,Adjoint of a linear transformation and its properties, Unitary Linear transformations.

CLASS: B.Sc./B.A. - III Year VI Sem
NAME OF PAPER –MECHANICS II
PAPER CODE(for B.Sc) -CML-606(i)
PAPER CODE(for B.A.) - BAMH-305(i)

SR. NO	MONTHS	PERIOD	TOPICS
1.	**1st**	1st week 2nd week 3rd week Last week	1.Analytical conditions of equilibrium of co-planar forces: Equilibrium of three forces, conditions of equilibrium, trigonometric theorem's, 2.conditions of equilibrium of co-planar forces (First, Second and Third form); Friction: Definition of friction and basic laws, 3.problems based on equilibrium of rods and ladders; Centre of gravity: Basic concepts and definitions, 4.centre of gravity of a uniform rod, a thin uniform lamina in the form of a parallelogram, 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.	**2nd**	1st week 2nd week 3rd week Last week	1. Motion of a particle attached to an elastic string, . Hooke's law, motion of horizontal and vertical elastic strings 2. Definition of work, Power and Energy, 3. work done by a variable force, work done in stretching an elastic string, principle of work and energy 4.Conservative system of forces, principle of conservation of energy, impulse of a constant force and a variable force
3.	**3rd**	1st week 2nd week 3rd week Last week	1Motion of a particle on smooth curves, 2. motion on the outside and inside of a smooth vertical circle, 3.cycloidal motion, 4.motion on a rough curve under gravity.
4.	**4th**	1st week 2nd week 3rd week Last week	1. Projectile motion of a particle in a plane, velocity at any point of the trajectory, 2.directions of projection for a particle, range and time of flight on an inclined plane,. 3. directions of projection for a given velocity and a given range; 4.range and time of fight down an inclined plane.

CLASS: B.Sc./B.A. - III Year VI Sem
NAME OF PAPER – REAL AND COMPLEX ANALYSIS

PAPER CODE(for B.Sc) -CML-607(i)
PAPER CODE(for B.A.) - BAMH-306(i)

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	1st week 2nd week 3rd week Last week	1Definition and examples of metric spaces, neighborhoods, 2. Limit points, interior points, open and closed sets, closure and interior, boundary points, 3.Subspace of a metric space, equivalent metrics, 4.Cauchy sequences, completeness, Cantor's intersection theorem.
2.	**2nd**	1st week 2nd week 3rd week Last week	1. Baire's category theorem, Contraction Principle, 2.Continuous functions, uniform continuity, compactness for metric spaces, 3.Sequential CompactnessBolzano-WeierstrassProperty, 4.Totalboundedness, finite intersection property, continuity in relation with compactness, connectedness.
3.	**3rd**	1st week 2nd week 3rd week Last week	1Improper integrals and their convergence, comparison tests, 2.Abel's and Dirichlet's tests 3.Frullani's integral, 4.Integral as a function of a parameter. Continuity, differentiability and integrability of an integral of a function of a parameter.
4.	**4th**	1st week 2nd week 3rd week Last week	1. Topology of complex numbers: Trigonometric, exponential, logarithmic and hyperbolic trigonometric functions. 2. Extended complex plane, Stereographic projection of complex numbers Continuity and differentiability of complex functions. 3. Analytic functions, Cauchy-Riemann equations,.harmonic conjugates, harmonic functions 4. Construction of analytic functions: direct method and Milne-Thomson method

CLASS: B.Sc./ B.A. III Year VI Sem

SKILL ENHANCEMENT

NAME OF PAPER – SOLID GEOMETRY

PAPER CODE (for B.Sc.) – CML-608(i)

PAPER CODE (for B.A.) –BAMH-307(i)

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	1st week & 2nd week	Central Conicoids: Equation of tangent plane.
		3rd week & Last week	Director sphere. Normal to the conicoids.
2.	**2nd**	1st week & 2nd week	Polar plane of a point. Enveloping cone of a coincoid.
		3rd week & Last week	Enveloping cylinder of a coincoid.
3.	**3rd**	1st week & 2nd week	Paraboloids: Circular section,
		3rd week & Last week	Plane sections of conicoids.
4.	**4th**	1st week & 2nd week	Generating lines. Confocal conicoid.
		3rd week & Last week	Reduction of second degree equations

B.Sc.(Hons)

Mathematics

Even Semesters

CLASS:B.Sc.(Hons) Mathematics-I Year IISem
NAME OF PAPER – Elementary Mathematics-II
PAPER CODE - BML-201

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.Matrix Algebra** : Introduction, types of matrices, addition and multiplication of matrix, transpose of matrix, concept of elementary row and column operations. 2.Determinant and its properties, minors, cofactors. Application of determinants in finding area of triangle. 3.Adjoint and inverse of square matrix. 4.Solution of homogeneous and non-homogeneous linear equations and condition for solution.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.Differential Calculus** : Differentiation of standard functions including function of a function (Chain rule). 2.Differentiation of implicit functions, logarithmic differentiation, parametric differentiation, elements of successive differentiation. **3.Integral Calculus** : Integration as inverse of differentiation, indefinite integrals of standard forms, 4.Integration by parts, partial fractions and substitution. Formal evaluation of definite integrals.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	**1.Ordinary Differential Equations** : Definition and formation of ordinary differential equations, equations of first order and first degree, 2.variable separable, homogeneous equations, linear equations (Leibnitz form) and differential equations reducible to these types, 3.Linear differential equation of order greater than one with constant coefficients, 4.complementary function and particular integrals.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	**1.Partial Differential Equations**: Introduction and formation of P.D.E., solution of P.D.E., 2.linear equation of first order (Lagrange's Equation), Non-Linear Equation of first order. **3.Vector Calculus:** Differentiation of vectors, scalar and vector point functions, gradient of scalar field and directional derivative, 4.divergence and curl of vector field and their physical interpretation.

CLASS:B.Sc.(Hons) Mathematics-I Year II Sem
NAME OF PAPER – Mathematics-II Calculus
PAPER CODE - BML-202

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Definition of the limit of a function. Basic properties of limits, 2.Continuous functions and classification of discontinuities. Differentiability. 3.Successive differentiation. Leibnitz theorem. 4.Maclaurin and Taylor series expansions.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Asymptotes in Cartesian coordinates, intersection of curve and its asymptotes, asymptotes in polar coordinates. 2.Curvature, radius of curvature for Cartesian curves, parametric curves, polar curves. Newton's method. Radius of curvature for pedal curves. Tangential polar equations. 3.Centre of curvature. Circle of curvature. Chord of curvature, evolutes. 4.Tests for concavity and convexity. Points of inflexion. Multiple points. Cusps, nodes & conjugate points. Type of cusps.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Tracing of curves in Cartesian, parametric and polar co-ordinates. 2.Reduction formulae. 3.Rectification, 4. Intrinsic equations of curve.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Quadrature (area) Sectorial area. 2. Area bounded by closed curves. 3.Volumes and surfaces of solids of revolution. 4.Theorems of Pappu's and Guilden.

CLASS:B.Sc.(Hons) Mathematics-II Year IVSem
NAME OF PAPER– Solid Geomerty
PAPER CODE - BML-401

SR. NO.	MONTHS	PERIOD	TOPICS
1.	1st	1st week 2ndweek 3rd week Last week	1.General equation of second degree. Tracing of conics. Tangent at any point to the conic, 2.chord of contact, pole of line to the conic, director circle of conic. 3.System of conics. Confocal conics. 4.Polar equation of a conic, tangent and normal to the conic.
2.	2nd	1st week 2nd week 3rd week Last week	Sphere: Plane section of a sphere. Sphere through a given circle. Intersection of twospheres, radical plane of two spheres. 2. Co-axal system of spheres 3.Cones. Right circular cone, enveloping cone and reciprocal cone. 4.Cylinder: Right circular cylinder and enveloping cylinder
3.	3rd	1st week 2nd week 3rd week Last week	1.CentralConicoids: Equation of tangent plane. 2.Director sphere. Normal to the conicoids. Polar plane of a point. 3.Enveloping cone of a coincoid. 4. Enveloping cylinder of a coincoid.
4.	4th	1st week 2nd week 3rd week Last week	1.Paraboloids: Circular section, 2.Plane sections of conicoids. 3.Generating lines. Confocal conicoid. 4. Reduction of second degree equations.

CLASS:B.Sc.(Hons) Mathematics-II Year IVSem
NAME OF PAPER –Transform Techniques
PAPER CODE - BML-402

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.Laplace Transform:** – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems, Laplace transforms of derivatives and integrals, 2.Differentiation and integration of Laplace transforms, Convolution theorem, 3. InverseLaplace transforms, convolution theorem, Inverse Laplace transforms of derivatives and integrals, 4.solution of ordinary differential equations using Laplace transform.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Finite Laplace transformation: Definition and Properties, shifting and scaling theorem. **2. Fourier transforms:** Linearity property, Shifting, Modulation, Convolution Theorem, 3.Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform, 4.Parseval's identity for Fourier transforms, solution of differential Equationsusing Fourier Transforms.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	**1.Mellin Transform:** Definition and Properties of Mellin transform, shifting and scalingproperties, 2.Mellin transform of derivaties and integral. **3 Z-Tranform:** Z-Tranform and inverse Z-Tranform of elementary function, shiftingtheorem, 4. Convolution theorem, initial and final value theorem.
4.	**4th**	**1st week** **2nd week** **3rd week** **&** **Last week**	**1.Hankel Tranform:** Basic properties of Hankel transform, Basic Operational properties, 2.Hankel transform of derivatives and some elementary functions, 3. Relation between Fourierand Hankel transform with application to boundary value problem and PDE.

CLASS:B.Sc.(Hons) Mathematics-II Year IVSem
NAME OF PAPER – Elementary Partial Differential Equations
PAPER CODE - BML-403

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week** **3rd week** **Last week**	1.Partial differential equations: Formation, order and degree, Linear and Non-Linear Partialdifferential equations of the first order: Complete solution,singular solution, Generalsolution, 3.Solution of Lagrange's linear equations, Charpit's general method of solution. 4.Compatible systems of first order equations, Jacobi's method.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Linear partial differential equations of second and higher orders, 2.Linear and non-linearhomogeneous and non-homogeneous equations with constant coefficients, 3. Partialdifferential equation with variable coefficients reducible to equations with constant coefficients, their complimentary functions and particular integrals, 4.Equations reducible to linear equations with constant coefficients.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Classification of linear partial differential equations of second order, hyperbolic, parabolic and elliptic types, 2. Reduction of second order linear partial differential equations toCanonical (Normal) forms and their solutions, 3.Solution of linear hyperbolic equations, 4.Monge's method for partial differential equations of second order.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Cauchy's problem for second order partial differential equations, 2.Characteristic equationsand characteristic curves of second order partial differential equation, 3.Method of separationof variables: Solution of Laplace's equation, 4.Wave equation (one and two dimensions), Diffusion (Heat) equation (one and two dimension) in Cartesian Co-ordinate system.

CLASS:B.Sc.(Hons) Mathematics-II Year IVSem
NAME OF PAPER – Statics
PAPER CODE - BML-404

SR. NO.	MONTHS	PERIOD	TOPICS
1.	1st	1st week & 2nd week	Composition and resolution of forces.
		3rd week & Last week	Parallel forces. Moments and Couples.
2.	2nd	1st week & 2nd week	Analytical conditions of equilibrium of coplanar forces.
		3rd week & Last week	Friction. Centre of Gravity.
3.	3rd	1st week & 2nd week	Virtual work. Forces in three dimensions.
		3rd week & Last week	Poinsots central axis.
4.	4th	1st week & 2nd week	Wrenches. Null lines and planes.
		3rd week & Last week	Stable and unstable equilibrium.

CLASS:B.Sc.(Hons) Mathematics-II Year IVSem
NAME OF PAPER –Operations Research-I
PAPER CODE - BML-405

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Definition, scope, methodology and applications of OR. Types of OR models. 2.Concept of optimization, Linear Programming: Introduction, Formulation of a Linear Programming Problem (LPP), 3.Requirements for an LPP, Advantages and limitations of LP. 4.Graphical solution: Multiple, unbounded and infeasible solutions.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Principle of simplex method: standard form, basic solution, basic feasible solution. 2.Computational Aspect of Simplex Method: Cases of unique feasible solution, no feasiblesolution, 3.multiple solution and unbounded solution and degeneracy. 4.Two Phase and Big- Mmethods.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Duality in LPP, primal-dual relationship. 2.Transportation Problem: Methods for finding basic feasible solution of a transportation problem, 3.Modified distribution method forfinding the optimum solution, 4.Unbalanced and degenerate transportation problems,transhipment problem, maximization in a transportation problem.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Assignment Problem: Solution by Hungarian method, 2.Unbalanced assignment problem,maximization in an assignment problem, Crew assignment and Travelling salesmanproblem. 3.Game Theory: Two person zero sum game, Game with saddle points, 4.the rule of dominance; Algebraic, graphical and linear programming methods for solving mixed strategy games.

CLASS:B.Sc.(Hons) Mathematics-II Year IVSem
NAME OF PAPER – Special Functions-II
PAPER CODE - BML-406

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**Laguerre Polynomials:** Laguerre's equation and its solution, 2.generating function, 3. alternative expression for the Laguerre polynomials, 4.explicit expressions and special values of the Laguerre polynomials,
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.orthogonality properties of Laguerre polynomials, 2.relation between Laguerre polynomials and their derivatives, 3.recurrence relations, associatedLaguerre polynomials, 4.properties of the associated Laguerre polynomials.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	**1.Hypergeometric functions:** The hypergeometric series, 2.an integral formula for thehypergeometric series, the hypergeometric equation, 3.linear relation between the solutions of the hypergeometric equation, 4.relation of contiguity,
4.	**4th**	**1st week & 2nd week** **3rd week & Last week**	1the confluent hypergeometric function, 2generalized hypergeometric series

CLASS: B.Sc.(Hons) Mathematics-III Year VI Sem
NAME OF PAPER – Real and Complex Analysis
PAPER CODE - BML-601

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Jacobians, 2.Beta and Gama functions, 3.Double and Triple integrals, Dirichlets integrals, 4.Change of order of integration in double integrals.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Fourier's series: Fourier expansion of piecewise monotonic functions, 2. Properties of Fourier Co-efficients, Dirichlet's conditions, Parseval's identity for Fourier series, 3.Fourier series for even and odd functions, 4.Half range series, Change of Intervals.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Extended Complex Plane, Stereographic projection of complex numbers, 2.continuity and differentiability of complex functions, 3.Analytic functions, Cauchy-Riemann equations. 4.Harmonic functions.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Mappings by elementary functions: Translation, rotation, 2. Magnification and Inversion. 3.Conformal Mappings, Mobius transformations. 4.Fixed pints, Cross ratio, Inverse Points and critical mappings.

CLASS: B.Sc.(Hons) Mathematics-III Year VI Sem
NAME OF PAPER – Linear Algebra
PAPER CODE - BML-602

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week**	1.Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span,
		2nd week	2.Linearly Independent and dependent subsets of a vector space. Finitely generated vector space,
		3rd week	3.Existence theorem for basis of a finitely generated vector space,
		Last week	4.Finite dimensional vector spaces, Invariance of the number of elements of bases sets, Dimensions, Quotient space and its dimension.
2.	**2nd**	**1st week**	1.Homomorphism and isomorphism of vector spaces,
		2nd week	2.Linear transformations and linear forms on vector spaces,
		3rd week	3.Vector space of all the linear transformations Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimensional vector spaces,
		Last week	4.Null Space, Range space of a linear transformation, Rank and Nullity Theorem,
3.	**3rd**	**1st week**	1.Algebra of Linear Transformation, Minimal Polynomial of a linear transformation,
		2nd week	2.Singular and non-singular linear transformations,
		3rd week	3. Matrix of a linear Transformation, Change of basis,
		Last week	4.Eigen values and Eigen vectors of linear transformations.
4.	**4th**	**1st week**	1.Inner product spaces, Cauchy-Schwarz inequality,
		2nd week	2.Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis,
		3rd week	3.Bessel's inequality for finite dimensional vector spaces, Gram-Schmidt, Orthogonalization process,
		Last week	4. Adjoint of a linear transformation and its properties, Unitary linear transformations.

CLASS: B.Sc.(Hons) Mathematics-III Year VI Sem
NAME OF PAPER – Numerical Analysis
PAPER CODE - BML-603

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1Finite Differences operators and their relations. Finding the missing terms and effect of error in a difference tabular values, 2.Interpolation with equal intervals: Newton's forward and Newton's backward interpolation formulae. 3. Interpolation with unequal intervals: Newton's divided difference, 4. Lagrange's Interpolation formulae.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Central Differences: Gauss forward and Gauss's backward interpolation formulae, 2.Sterling, Bessel Formula. 3. Eigen Value Problems: Power method, Jacobi's method, Given's method, 4.House-Holder's method, QR method, Lanczos method.
3.	**3rd**	**1st week** **&** **2nd week** **3rd week** **&** **Last week**	1.Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections–I & II. 2.Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one- third and three-eighth rule, Gauss Quadrature formula.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Difference equation: Formation of difference equation, Linear difference equation, 2.Difference equation reducible to linear form. Numerical solution of ordinary differential equations: Single step methods-Picard's method. 3.Taylor's series method, Euler's method, Runge-Kutta Methods. Multiple step methods; 4.Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.

CLASS: B.Sc.(Hons) Mathematics-III Year VI Sem

NAME OF PAPER – Numerical Analysis-Lab

Practical

PAPER CODE - BMP-604

S R. N O.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week & Last week**	Programming in C 1 To integrate numerically using Trapezoidal rule. 2. To integrate numerically using Simpson's one-third rule. 3. To integrate numerically using Simpson's three-eighth rule.
2.	**2nd**	**1st week & 2nd week** **3rd week & Last week**	4.To find numerical solution of ordinary differential equations by Euler's method/ Modified Euler's method, **5.** Taylor's series Method **6.** To find numerical solution of ordinary differential equations by Runge -Kutta method.
3.	**3rd**	**1st week & 2nd week** **3rd week & Last week**	7 To interpolate the data using Newton's forward interpolation formula 8 To interpolate the data using Newton's backward interpolation formula
4.	**4th**	**1st week & 2nd week** **3rd week** **Last week**	9. To interpolate the data using Gauss's forward interpolation formula 10. To interpolate the data using Gauss's backward interpolation formula 11. To interpolate the data using Lagrange's interpolation formula

CLASS: B.Sc.(Hons) Mathematics-III Year VI Sem
NAME OF PAPER – Dynamics
PAPER CODE - BML-605

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week** **3rd week & Last week**	1.Velocity and acceleration along radial, transverse, tangential and normal directions. 2.Relative velocity and acceleration. Simple harmonic motion. Elastic strings.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Mass, Momentum and Force. 2.Newton's laws of motion. 3.Work, Power and Energy. 4.Definitions of Conservative forces and Impulsive forces.
3.	**3rd**	**1st week & 2nd week** **3rd week & Last week**	1.Motion on smooth and rough plane curves. 2.Projectile motion of a particle in a plane. Vector angular velocity.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.General motion of a rigid body. Central Orbits, 2.Kepler laws of motion. 3.Motion of a particle in three dimensions. 4.Acceleration in terms of different co-ordinate systems.

CLASS: B.Sc.(Hons) Mathematics-III Year VI Sem
NAME OF PAPER – Mathematical Modeling
PAPER CODE - BML-606

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week & 2nd week 3rd week & Last week**	The process of Applied Mathematics: Mathematical modeling, need, techniques, classification and illustrative.
2.	**2nd**	**1st week 2nd week 3rd week & Last week**	1.Mathematical modeling through ordinary differential equation of first order. 2.Mathematical modeling in population dynamics, 3.mathematical modeling of epidemic and compartment models through system of ordinary differential equations.
3.	**3rd**	**1st week & 2nd week 3rd week Last week**	1.Mathematical modeling in economics, in medicine, Arms race, Battle, international trade and 2.dynamics through ordinary differential equations. 3.Mathematical modeling through ordinary differential equation of record order.
4.	**4th**	**1st week & 2nd week 3rd week Last week**	1.Mathematical modeling through difference equations: need, basic theory, 2.economics and finance, 3.population dynamics and Genetics, 4.probability theory and examples.

M.Sc.

Mathematics

Even Semesters

CLASS:M.Sc. Mathematics-I Year IISem
NAME OF PAPER –ABSTRACT ALGEBRA
PAPER CODE -MAL-521

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Canonical Forms-Similarity of linear transformations. 2. Invariant subspaces. Reduction to triangular forms. 3. Nilpotent transformations. Index of nilpotency. 4.Invariants of a nilpotenttransformation.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**The primary decomposition theorem. 2.Jordan blocks and Jordan forms. 3 Rational canonical form. 4.Generalized Jordan form over any field.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Cyclic modules. Free modules. 2.Simple modules. Semi-simple modules. 3.Schur's Lemma.Noetherian and Artinian modules and rings 4. Hilbert basis theorem.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Wedderburn-Artin theorem. Uniform modules, primary modules, 2.Noether-Laskertheorem. Smith normal form over a principal ideal domain and rank. 3.Fundamental structure theorem for finitely generated abelian groups 4.Its application to finitely generated Abelian groups.

CLASS:M.Sc. Mathematics-I Year IISem
NAME OF PAPER– MEASURE AND INTEGRATION THEORY
PAPER CODE -MAL-522

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week**	1.Measurable functions and their equivalent formulations, Properties of measurable functions.
		2nd week	2. Approximation of measurable functions by sequences of simple functions,
		3rd week	3.Measurable functions as nearly continuous functions, Egoroffs theorem, Lusin's theorem,
		Last week	4.Convergence in measure and F. Riesz theorem for convergence in measure, Almost uniformconvergence.
2.	**2nd**	**1st week**	**1**.Shortcomings of Riemann Integral. Lebesque Integral of a bounded function over a set of finite measure and its properties,
		2nd week	2.Lebesgue integral as a generalization of Riemann integral,Bounded convergence theorem,
		3rd week	3.Lebesgue theorem regarding points of discontinuities of Riemann integrable functions, Integral of non-negative functions,
		Last week	4.Fatou's Lemma, Monotone convergence theorem, General Lebesgue Integral, Lebesgue convergence theorem.
3.	**3rd**	**1st week**	1.Vitali's covering Lemma, Differentiation of monotonic functions,
		2nd week	2.Functions of boundedvariation and its representation as difference of monotonic functions.
		3rd week	3.Differentiation of Indefiniteintegral. Fundamental Theorem of Calculus.
		Last week	4.Absolutely continuous functions and theirproperties.
4.	**4th**	**1st week**	1.Lpspaces, Convex functions, Jensen's inequalities,
		2nd week	2.The Holder and Minkowskiinequalities,
		3rd week	3.Convergence and Completeness of Lpspace, Riesz-Fisher Theorem,
		Last week	4. Boundedlinear functional on Lpspace, Riesz representation theorem.

CLASS:M.Sc. Mathematics-I Year IISem
NAME OF PAPER –METHODS OF APPLIED MATHEMATICS
PAPER CODE -MAL-523

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd weeK** **Last week**	1.Fourier Transforms - Definition and properties, 2.Fourier transform of some elementary functions, convolution theorem, 3.Application of Fourier transforms to solve ordinary & partial differential equations. 4.Curvilinear Co-ordinates : Co-ordinate transformation, Orthogonal Co-ordinates
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Changeof Co-ordinates, Cartesian, Cylindrical and spherical co-ordinates, 2 Expressions for velocity and accelerations, ds, dv and ds2 in orthogonal co-ordinates, 3.Areas, Volumes & surface areas in Cartesian, Cylindrical & spherical co-ordinates in a few simple cases, Grad, div, 4.Curl, Laplacian in orthogonal Co-ordinates, Contravariant and Co-variant components of a vector, Metric coefficients & the volume element.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Sample spaces, random variables, 2.Mathematical expectation and moments, 3.Binomial,Poisson, Geometric, 4.Uniform and Exponential distributions.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1Normal & Gamma distributions. 2.Multiple Regression, Partial 3.Multiple Correlation, t,F and Chi-square distributions, 4 Weak law of large numbers and Central Limit Theorem..

CLASS:M.Sc. Mathematics-I Year IISem
NAME OF PAPER –ORDINARY DIFFERENTIAL EQUATIONS-II
PAPER CODE -MAL-524

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2ndweek** **3rd week** **Last week**	1.Linear systems, fundamental set and fundamental matrix of a homogeneous system, 2.Wronskianof a system. Abel - Liouville formula, Adjoint systems, 3.Reduction of the order of a homogeneoussystem. 4.Systems with constant coefficients, Method of variation of constants for a non-homogeneous system, Periodic solutions, Floquet theory for periodic systems
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1**.Linear differential equations of ordern, Lagrange's identity, Green's formula 2.Nonlinear differential equations, Plane autonomous systems and their critical points 3. Classification of critical points-rotation points, foci, nodes, saddle points. Stability, asymptotical stability and unstability of critical points, 4. Almost linear systems, Perturbations, Simple critical points
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Dependence on a parameter, Liapunov function, 2.Liapunov's method to determine stability for nonlinearsystems, Limit cycles, 3.Bendixson non-existence theorem, Statement of Poincare-Bendixson theorem,Index of a critical point 4. Motivating problems of calculus of variations
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Shortest distance, Minimum surface of revolution, Brachistochrone problem, 2.Isoperimetric problem, Geodesic, Fundamental lemma ofcalculus of variations, 3.Euler's equation for one dependent function and its generalization to 'n'dependent functions and to higher order derivatives, 4.Conditional extremum under geometric constraints and under integral constraints.

CLASS:M.Sc. Mathematics-I Year IISem
NAME OF PAPER –COMPLEX ANALYSIS-II
PAPER CODE -MAL-525

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1Analytic Continuation; Spaces of Analytic functions, Hurwitz's theorem, 2.Montel'stheorem, Uniqueness of direct analytic continuation, 3. Uniqueness of analytic continuation along a curve, power series method of analytic continuation. 4.Monodromy theorem and its consequences
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**Entire function; Canonical products, Weierstrass' factorisation theorem, 2.Exponent of Convergence, Order of an entire function, Jensen's formula, 3.Borel's theorem. Hadamard's factorization theorem, 4.Hadamard's three circles theorem.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.The range of an analytic function. Bloch's theorem. 2.The Little Picard theorem. Schottky'stheorem. 3.MontelCaratheodory and the Great picard theorem. Conformal mapping; 4.Riemann mapping theorem, Harmonic function on a disk, Dirichletproblem.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1. Green's function. Harnack's inequality and theorem, 2.Univalent functions. Bieberbach's conjecture (Statement only) and the 1/4 theorem. Meromorphic Function; 3.Gamma function and its properties, Riemann Zeta function, Riemann'sfunctional equation. 4.Runge's theorem, Poisson-Jensen formula.

CLASS:M.Sc. Mathematics-I Year IISem
NAME OF PAPER–Advanced Numerical Methods
PAPER CODE -MAL-526

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Interpolation: Introduction of Gauss' Central Difference Formulae, Stirling's Formula, Bessel's Formula without proof, 2.Everett's Formula, Relation between Bessel's and Everett's Formulae. Hermite'sInterpolation Formula, Divided Differences and Their Properties, 3.Newton's General InterpolationFormula, Interpolation by Iteration, Inverse Interpolation, Double Interpolation. 4.Approximation: Norms of functions – Best Approximations: Least squares polynomial approximation–Approximation with Chebyshev polynomials – Piecewise Linear & Cubic Spline approximation.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Numerical Differentiation: Errors in Numerical Differentiation, Cubic Splines Method, Differentiation Formulae with Function Values, Maximum and Minimum Values of a Tabulated Function. 2.Numerical Integration: Boole's and Weddle's rules, use of Cubic splines, Romberg integration, Newton-Cotes integration formula, Euler-Maclaurin formula, Adaptive Quadrature method. Gaussian integration, 3.Numerical evaluation of Singular integrals, Numerical evaluation of double and triple integrals withconstant and variable limits and its application, 4.Solution of integral equations. Iterative Method for System of Linear Equations
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.General iterative method. Jacobi and Gauss-Seidel method. Relaxation method. 2.Necessary and sufficient conditions for convergence. Speed of convergence.S.O.R. and S.U.R. methods. 3.Determination of eigenvalue by iterative methods. Ill conditioned system.Solution of tridiagonal system, 4.Iterative Method for System of Non-linear Equations: Complex root of non-linear equation, solution ofsimultaneous non-linear equations.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Initial value problems: RungeKutta methods of fourth order, Multistep method- The Adams-Moulton method, stability, 2. Convergence and Truncation error for the above methods. Milne's method, Cubicspline method, 3.Simultaneous and higher order equations, Boundary Value Problems: Second order finite difference, 4.Shooting method and Cubic spline methods, Numerov's method, Mixed BVPs.

CLASS:M.Sc. Mathematics-I Year IISem
NAME OF PAPER– Computing Lab-MATLAB
PAPER CODE - 527

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.MATLAB Basics : working in the command window, Arithmetic Operations , Elementary Math Built-in Functions, Variable names, script files, 2.Matrices and Arrays, Input to a Script file Output commands-The disp Command, 3. The fprintf Command, the save and load commands, Importing and Exporting data. 4. Two-dimensional plots, formatting a plot. Multiple plots on the same page.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**Operations with Arrays: Creating, Concatenating, and Expanding Matrices, 2.Removing Rows or Columns from a Matrix, Reshaping and Rearranging Arrays, 3.Multidimensional Arrays, Array Indexing, Mathematical Operations with Arrays, 4.Systems of Linear Equations and solutions.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1. Programming in MATLAB: Relational and logical operators, 2. 2.Conditional statements : if-end, if-else-end, if-elseif-else-end Structures. 3. The switch-caseStatement . LOOPS: for-end, while-end loops, Nested loops and nested conditional statements, 4.the break and continue commands. Creating a function file, local and global variables.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Symbolic math: Symbolic objects and symbolic expressions, 2.Creating symbolic objects,creating symbolic expressions, 3.the find sym command and the default symbolic variable, 4.Changing the form of an existing symbolic expression.

CLASS:M.Sc. Mathematics-II Year IVSem
NAME OF PAPER–FUNCTIONAL ANALYSIS
PAPER CODE -641

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2ndweek** **3rd week** **Last week**	1.Normed linear spaces, metric on normed linear spaces, Holder's and Minkowski'sinequality, 2.completeness of quotient spaces of normed linear spaces. Completeness of l_P, L_P, R^n, C^n and C[a, b]. 3.Bounded linear transformation. Equivalent formulation of continuity. 4.Spaces of bounded linear transformation. Continuous linear functional, conjugate spaces.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**Hahn Banach extension theorem (Real and Complex form), Riesz Representation theorem for bounded linear functionals on LP and C[a, b]. 2.Second Conjugate spaces, Reflexive spaces, 3.Uniform boundedness principle and its consequence, 4.Open mapping theorem and its application, projections, closed graph theorem.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Equivalent norms, weak and strong convergence, their equivalence in finite dimensionalspaces. 2. Compact operators and its relation with continuous operators, 3.Compactness of lineartransformation on a finite dimensional space, 4.Properties of compact operators, compactness of the limit of the sequence of compact operators.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1Inner product spaces, Hilbert spaces, Schwarz's inequality, 2.Hilbert space as normed linear space, convex sets in Hilbert spaces. 3. Projection theorem, orthonormal sets, Bessel's inequality, 4.Parseval's identity, Conjugate of a Hilbert space.. .

CLASS:M.Sc. Mathematics-II Year IVSem
NAME OF PAPER– DIFFERENTIAL GEOMETRY
PAPER CODE -642

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Curves with torsion: Tangent, 2.Principal Normal, Curvature, 3.Binormal, Torsion, 4.Serret Frenet formulae
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**Locus of centre of Curvature, 2.Locus of centre of Spherical 3.Curvature, Surfaces, Tangent plane, 4.Normal, Envelope, Characteristics, Edge of regression
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Curvilinear Co-ordinates, 2.First order magnitudes, Directions on a surface, 3.The Normal, Second order magnitudes, 4.Derivative of unit normal
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1. Principal directions and curvatures, 2.First and Second curvatures, 3.Geodesic property, Equations of geodesics, 4. Surface of revolution, Torsion of a geodesic.

CLASS:M.Sc. Mathematics-II Year IVSem
NAME OF PAPER– MECHANICS OF SOLIDS-II
PAPER CODE -643

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2ndweek** **3rd week** **Last week**	1.Two-dimensional Problems: Plane stress. Generalized plane stress. Airy stress function. 2.General solution of Biharmonic equation. Stresses and displacements in terms of complex potentials. 3. The structure of functions of $\phi(z)$ and $\psi(z)$. First and second boundary value problems in plane elasticity, 4.Thick-walled tube under external and internal pressures.
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**Viscoelasticity: Spring & Dashpot, 2. Maxwell & Kelvin Models, 3.Three parameter solid, 4 Correspondence principle& its application to the Deformation of a viscoelastic Thick-walled tube in Plane strain.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Torsion: Torsion of cylindrical bars. Tortional rigidity. Torsion and stress functions. 2. Lines of shearing stress. Simple problems related to circle, ellipse and equilateral triangle. 3. Waves: Propagation of waves in an isotropic elastic solid medium. Waves of dilatation and distortion. 4. Plane waves. Elastic surface waves such as Rayleigh and Love waves.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1Variationalmethods - Theorems of minimum potential energy. 2.Theorems of minimum complementary energy. Reciprocal theorem of Betti and Rayleigh. 3.Deflection of elastic string and elastic membrane. Solution of Euler's equation by Ritz, 4. Galerkin and Kantorovich methods. .

CLASS:M.Sc. Mathematics-II Year IVSem
NAME OF PAPER–INTEGRAL EQUATIONS
PAPER CODE -644

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Definition of Integral Equations and their classification.Relation between integral and differential equations Fredholm integral equations of second kind with separable kernels. 2.Eigen Values and Eigen functions. Reduction to a system of algebraic equations. 3.An approximate Method. Method of successive approximations.Iterative scheme. 4. Condition of convergence and uniqueness of series solution. Resolvent kernel and its results. Fredholm theorems
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1** Solution of Volterra's integral equations by iterative scheme. Successive approximation. 2.Resolvent kernel. Integral transform methods: Fourier transform, 3. Laplace transform, Convolution integral, 4. Application to Volterra integral equations with Convolution type kernels, Abel's equations
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Symmetric kernel. Complex Hilbert space. Orthonormal system of functions, 2.Fundamental properties of eigen values and eigen functions for symmetric kernels. 3. Expansion in eigen function and bilinear form, Hilbert Schmidt theorem, 4.Solution of integral equations with symmetric kernels
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Singular Integral Equations 2. Inversion formula for singular integral equation with kernel of type (h(s) - h(t) - a, 0< a <1). 3.Dirac Delta Function. Green's function approach to reduce boundary value problems of a self-adjoint differential equation with homogeneous boundary conditions to integral equation forms. 4.Auxiliary problem satisfied by Green's function. Modified Green's function

CLASS:M.Sc. Mathematics-II Year IVSem
NAME OF PAPER–: ADVANCED FLUID MECHANICS
PAPER CODE -645

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.Stress components in a real fluid, stress tensor, Symmetry of the stress tensor, Stresses in a fluid at rest, 2.Relations between rectangular components of stress in transformed coordinate system, Connection between stresses and velocity gradients. 3.Viscous fluid, Navier-Stokes equations of motion. Laminar Flows, Exact solution of Navier-Stokes equations: Couette flows 4.Generalized Couette flow between two parallel plates, Plane Poiseuille flow, Hagen-Poiseuille flow
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	**1.**Flow through tubes of uniform cross section in the form of circle, annulus, ellipse and equilateral triangle under constant pressure gradient. 2.Unsteady flow over a flat plate: Stokes First & second Problem. Dynamical similarity: Dimensional Analysis and Buckingham π-theorem. 3.Reynolds number, Wever Number, Mach Number, Froude Number, Eckert Number, 4.Application of pitheorem to viscous and compressible fluid flow
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Boundary Layer Flow: Prandtl's boundary layer approximation, 2.Boundary layer thickness, displacement thickness, momentum thickness, boundary layer equations in two-dimensions, 3.Flat Plate Boundary Layer-Blasius solution, Karman integral equations. 4.Boundary Layers with Pressure Gradients: Separation of boundary layer.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Compressible flow: Stagnation properties. Wave motion in a gas: Speed of Sound, 2. Equation of motion of a gas, Variation of fluid velocity with flow area, Subsonic, Sonic and Supersonic flows of a gas. 3.Isentropic gas flows: Property relations for isentropic flow of ideal gases, Flow through a nozzle; 4. Converging Nozzles, Converging–Diverging Nozzles. .

CLASS:M.Sc. Mathematics-II Year IVSem
NAME OF PAPER– COMPUTING LAB-III
PAPER CODE -648

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1. Overview 2. Special Characters 3. Text, Making Tables 4. Bibliography with Bibtex,
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Math Mode, Equations and arrays 2. Specific operators of Mathematics 3. structure formations – Derivatives, Integrals 4. del operator, product and sum operator
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1. Making special parts 2. Format for technical writing – Article 3. , Report 4. Cover page
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1 Abstract, 2. other front matter, Back matter, 3.graphics, 4.Importing pictures.

CLASS:M.Sc. Mathematics-I Year I Sem

NAME OF PAPER –PROGRAMMING WITH FORTRAN (PRACTICAL)

PAPER CODE -MAL-517

*Practical will be based on the paper MAL-516/Programming with FORTRAN Theory

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	**1.Computer Programming in Fortran 90/95**: Numerical constants and variables, arithmetic expressions; implicit declaration, named constants, input/output; 2.List directed input/output statements, 3.Format specifications. Declarations including KIND specifications, 4.Use of complex variables, Pointers
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1 Logical expressions and control flow; conditional flow; IF structure, Block DO loop Counted controlled Loops. 2.arrays; input/output of arrays, arrays with variable size using ALLOCATABLE statement, 3.arrays handling functions, 4. multidimensional arrays
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Strings, declaration of character variables, 2. character handling functions, operators on strings, 3.Subprograms, Types of Subprograms, Significance Functions; subroutines; 4. Procedures with array arguments, Recursion
4.	**4th**	**1st week** **2nd week** **3rd week** **&Last week**	1.Derived types, Elements of derived type, arrays and derived type 2.Processing files, Sequential file, 3. Direct Access file; creating and closing a file and 4.Accessing elements using pointers with example

CLASS:M.Sc. Mathematics-II Year IIISem
NAME OF PAPER –Computing Lab-II (MATLAB Programming & Applications)
PAPER CODE -MAL-634

SR. NO.	MONTHS	PERIOD	TOPICS
1.	**1st**	**1st week** **2nd week** **3rd week** **Last week**	1.User-Defined Functions and Function Files: Main Features of a Function file, Saving aFunction File, Using a User-Defined Function, 2.Comparison between Script Files and Function Files, Anonymous and Inline Functions: Anonymous Functions, Inline Functions. 3.Functions:Using Function Handles for Passing a Function into a Function, Using a Function Name for Passing a Function into a Function. 4.Subfunctions, Nested Functions..
2.	**2nd**	**1st week** **2nd week** **3rd week** **Last week**	1.Polynomials: Value of a Polynomial, Roots of a Polynomial, Addition, Multiplication and Division of Polynomials, 2.Derivatives of Polynomials. Curve Fitting with Polynomials, The polyfit Function, Curve Fitting with Functions other than Polynomials. 3.Applications in Numerical Analysis: Solution of an Equation with one Variable, Minimum or a Maximum of a Function, 4.Numerical Integration, Ordinary Differential Equations.
3.	**3rd**	**1st week** **2nd week** **3rd week** **Last week**	1.Three Dimensional Plots: Line Plots, Mesh and Surface Plots, Plots with Special Graphics, 2.The View Command.Symbolic Math: Solving Algebraic Equations, 3.Differentiation, Integration, Solving an OrdinaryDifferential Equation, Plotting Symbolic Expressions, 4.Numerical Calculations with Symbolic Expressions.
4.	**4th**	**1st week** **2nd week** **3rd week** **Last week**	1.Numerical Methods - Interpolation : Lagrange′s interpolation formula, 2.Newton Gregoryforward interpolation formula, Newton Gregory backward interpolation formula. 3.Solution of asystem of Linear Equations: (Unique solution case only) :Gauss – Elimination Method, Gauss – Jordan Method. 4.Solution of Ordinary Differential Equations: Euler's Method,Euler′s Modified Method , RungeKutta Second and Fourth order Method..

The question paper will consist of Two sections Theory and Practical. Question No. 1 based on theory will contain Four short answer type questions without any internal choice covering the entire syllabus and shall be compulsory. Each of the two sections will contain two questions and the students are required to solve two questions practically taking one question from each section. All questions carry equal marks.