Lesson Plan

Name of Teacher: AJAY KUMAR

Class: BSC/B.A. 1st Year/ 1st Semester

Paper: Algebra &Number Theory

Session: 2025-2026

Sr.No.	Months	Weeks	Topics
1	July	3rd Week 4th Week Last Week	1. Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices. 2. Elementary Operations on Matrices. 3. Rank of matrices, Inverse of a matrix.
2.	August	1st Week 2nd Week 3rd Week 4th Week Last Week	1. Linear dependence and independence of rows and columns of matrices. 2. 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. 5. Applications of matrices to a system of linear (homogeneous and non–homogeneous) equations. Theorems on consistency of a system of linear equations.
3.	September	1st Week 2nd Week 3rd Week 4th Week 5th Week	1. Unitary and Orthogonal Matrices, Bilinear and Quadratic forms. 2. Canonical Form of a bilinear form. Matrix notation of Bilinear and Quadratic Form 3. Linear Transformation of a Quadratic form. Lagrange's method of Diagonalization. 4. Factorable Quadratic Form. Sylvester's Criterion 5. Test &Revision
4.	October	1st Week 2nd Week 3rd Week Last Week	1. Relations between roots and coefficients of general polynomial equation in one variable. Synthetic Division. 2. Remainder Theorem and factor Theorem. Solutions of polynomial equations having conditions on roots. 3. Common roots and multiple roots. Transformation of equations and test. 4. Nature of the roots of an equation, Solutions of cubic equations (Cardan's Method)
5.	November	1st&2nd Week 3rd Week 4th Week	1. Solution of Biquadratic equations (Descarte's Method, Ferrari's Method) 2. Descarte's rule of signs for Polynomial. Location of roots in an interval. 3.Revision

Name of Teacher: AJAY KUMAR

Class: BA/BCom. 1st Year/ 1st Semester

Paper: Mathematics for Everyday Life

Session: 2025-2026

Sr.No.	Months	Weeks	Topics
1	July	3rd Week 4th Week Last Week	1.Number system 2.LCM and HCF of numbers, decimal fractions 3. square and cube roots
2.	August	1st Week 2nd Week 3rd Week 4th Week Last Week	1.Average, Problems on Numbers 2. problems on Ages 3.Surds and Indices 4.Percentage 5.Revision &Test
3.	September	1st Week 2nd Week 3rd Week 4th Week 5th Week	1.Profit and Loss 2.Ratio and Proportion 3.Partnership, Chain Rule 4.problems based on the topics of Calendar and Clocks 5.Revision
4.	October	1st Week 2nd Week 3rd Week Last Week	1.Time and Work 2.Time and Distance 3.Area, Volume and Surface Area 4. Revision
5.	November	1st,2nd 3rd , 4th Week	Revision

Name of Teacher: AJAY KUMAR Class: BSc/B.A. 2nd Year/Semester 3rd

Paper: Differential Equations Session: 2025-2026

Sr.No.	Months	Weeks	Topics
1.	July	3rd Week 4th 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. Singular solutions,Orthogonal trajectories: in Cartesian coordinates and polar coordinates.
2.	August	1st Week 2nd Week 3rd Week 4th Week Last Week	1. Self orthogonal family of curves. Linear differential equations with constant coefficients. 2. Homogeneous linear ordinary differential equations. Equations reducible to homogeneous. 3. Linear differential equations of second order. Reduction to normal form and Test. . 4. Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations. 5. Revision &Test
3.	September	1st Week 2nd Week 3rd Week 4th Week Last Week	1. Partial differential equations: Formation, order and degree, Linear and Non-Linear Partial differential equations of the first order: Complete solution. 2. Singular solution, General solution, Solution of Lagrange's linear equations, Charpit's general method of solution. 3. Compatible systems of first order equations, Jacobi's method. 4. Linear partial differential equations of second and higher orders, Linear and non-linear homogeneous and non- homogeneous equations with constant coefficients 5. Revision
4.	October	1st Week 2nd Week 3rd Week Last Week	1. Partial differential equation with variable coefficients reducible to equations with constant coefficients, their complimentary functions and particular integrals, 2. Equations reducible to linear equations with constant coefficients. Method of separation of variables: Solution of Laplace's equation and Test. 3. Wave equation (one and two dimensions), Diffusion (Heat) equation (one and two dimension) in Cartesian Co-ordinate system. 4. Classification of linear partial differential equations of second order, hyperbolic, parabolic and elliptic types, Reduction of second order linear partial differential equations to Canonical (Normal) forms and their solutions
5.	November	1st&2ndWeek 3rd &4th Week	1.Solution of linear hyperbolic equations, Monge's method for partial differential equations of second order. 2.Revision

Lesson Plan

Name of Teacher: AJAY KUMAR

Class: BSc/B.A. 3rd Year/Semester 5th

Paper: Groups and Rings

Session: 2025-2026

Sr.No.	Months	Weeks	Topics
1.	July	3rd Week 4th Week Last Week	1. Definition of a group. Examples of abelian and non abelian groups. 2. The group Zn of integers under addition modulo n and the group of (n) of units under multiplication modulo n, Generator of a group, Cyclic groups. 3. Revision
2.	August	1st Week 2nd Week 3rd Week 4th Week Last Week	1. Permutations groups, Alternating groups, Cayley's theorem. 2. Subgroups, Subgroup criteria, cosets, Left and right cosets, properties of cosets.Index of a sub-group, coset decomposition, Lagrange's theorem on groups and its consequences. 3. Normal subgroups, Quotient groups, 4. Homomorphisms, isomorphisms, automorphisms on group. 5. Revision &Test
3.	September	1st Week 2nd Week 3rd Week 4th Week Last Week	1. Center of a group and class equation of a group and derived group of a group. 2. Introduction to Rings, subrings. 3. Integral domains and Fields, Characteristics of a ring.Ring homomorphisms. 4. Theorems on Ring homomorphisms,Ideals (Principle, Prime and Maximal). 5. Revision
4.	October	1st Week 2nd Week 3rd Week Last Week	5. Quotient rings, Field of quotients of an integral domain. 6. Euclidean rings, Polynomial rings, Polynomials over the rational field. 7. The Eisenstein's criterion of irreducibility of polynomials over the field of rational numbers. 8. Revision
5.	November	1st&2ndWeek 3rd Week 4th Week	1.Polynomial rings over commutative rings. 2.Principal ideal domain, unique factorization domain 3.Revision

Lesson Plan

Name of Teacher: AJAY KUMAR
Paper: Sequence and Series

Class: B.A./B.Sc.3rd Year/5th Sem
Session: 2025-2026

Sr.No.	Months	Weeks	Topics
1.	July	3rd Week 4th Week 5th 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, Open sets, closed set, interior of a set, closure of a set in real numbers and their properties 3. Revision
2.	August	1st Week 2nd Week 3rd Week 4th 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, subs sequential 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. Revision 5. Revision
3.	September	1st Week 2nd Week 3rd Week 4th Week Last Week	1. Convergence and divergence of geometric series, Hyper Harmonic series or p-series. D-Alembert's ratio test. 2. Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Coefficients, Dirichlet's conditions. 3. Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, 4. Revision & Test 5. Revision
4.	October	1st Week 2ndWeek 3rd Week Last Week	1. Change of Intervals. Riemann integral: Definition and examples 2. Darboux's Theorem and condition of existence of Riemann's integral. 3. Integrabililty of continuous, monotonic functions and discontinuous functions 4. Revision of syllabus covered in first three weeks of October month.
5.	November	1st &2ndWeek 3rd Week 4th Week	1. Properties of integrable functions. Continuity and differentiability of integrable functions . 2. Primitive. The Fundamental theorem of integral calculus, Mean value theorems of integral calculus 3. Revision

Lesson Plan

Name of Teacher: AJAY KUMAR

Class: B.A./B.Sc. 3rd Year/Semester 5th

Paper: Number Theory & Trigonometry

Session: 2025-2026

Sr.No.	Months	Weeks	Topics
1.	July	3rd Week 4th Week Last Week	1. Linear Diophantine equation, prime counting function, Statement of prime number theorem, Goldbach conjecture 2. linear congruences, complete set of residues,Chinese remainder theorem 3. Revision
2.	August	1st Week 2ndWeek 3rd Week 4th Week Last Week	1. The Fermat's little theorem, Wilson's theorem, Number, theoretic functions 2. Sum and number of divisors, totally multiplicative functions. 3. Möbius inversion formula, the greatest integer function. 4. Revision of syllabus covered in first three weeks and test. 5. Revision &Test
3.	September	1st Week 2ndWeek 3rd Week 4th Week Last Week	1. Euler's phi-function, Euler's theorem, reduced set of residues, some properties of Euler's phi-function. 2. Order of an integer modulo n, primitive roots for primes, Composite numbers having primitive roots 3. Euler's criterion, the Legendre symbol and its properties, Quadratic reciprocity, quadratic congruences with composite moduli. 4. Revision 5. Revision
4.	October	1st Week 2ndWeek 3rd Week Last Week	1. Exponential, 2. Logarithmic, Circular functions; sin(nx),cos(nx), tan(nx). 3. Circular functions; $\sin^n x$, $\cos^n x$, $\tan^n x$. 4. Hyperbolic and inverse hyperbolic functions - simple problems
5.	November	1st &2ndWeek 3rd Week 4th Week	1. Gregory SeriesSummation of Trigonometric series, 2. Trigonometric expansions of sine and cosine as infinite products (without proof) 3. Revision

Name of Teacher: AJAY KUMAR Class:B.Sc./B.A.-I Year 1st Sem

NAME OF PAPER -Basic Algebra and Number Theory Lab Session: 2025-2026

Sr.No.	Months	Weeks	Topics
1.	July	3rd Week 4th Week Last Week	**1.** Introduction to PYTHON Language, The history of PYTHON Language **2.** Learn basic commands and applications, use basic operators and function and explore the different menus in PYTHON Language. 3 Revision
2.	August	1st Week 2ndWeek 3rd Week 4th Week Last Week	**1.** Learn Keywords/Reserved words and the use of predefined functions in PYTHON Language. **2.** To learn basic operations on matrices. **3.** To find the value of a determinant of matrix of order up to four. **4.** To compute inverse of square matrix of order up to four. 5 Revision and Test
3.	September	1st Week 2ndWeek 3rd Week 4th Week Last Week	**1.** To find Eigen values and Eigen vectors of square matrix of order up to four. **2.** To solve system of linear equations. **3.** To find roots of quadratic, cubic and biquadratic equations. **4.** To find multiple roots of algebraic equations. 5 Revision
4.	October	1st Week 2ndWeek 3rd Week Last Week	**1.** To discuss nature of roots of an equation and to learn the concept of divisibility in integers. **2.** To find the number of divisors of an integer. **3.** To find GCD and LCM of two integers. **4.** To find the remainder of an integer when divided by the integer.
5.	November	1st &2ndWeek 3rd Week 4th Week	**1.** To find the integers x, y such that d = ax + by where d is the g.c.d. of a and b. **2.** To solve problem based on the concept of primes and to solve problems based of the concept of linear congruence. 3 Revision

Name of Teacher: AJAY KUMAR Class:B.Sc./B.A.-II Year 3rd Sem

NAME OF PAPER -Differential Equations Lab Session: 2025-2026

Sr.No.	Months	Weeks	Topics
1.	July	3rd Week 4th Week Last Week	1. Basic Commands and symbols to write differential equations 2. Commands used to find the derivative and integration of a function 3. Revision
2.	August	1st Week And 2ndWeek 3rd Week And 4th Week Last Week	1 To find the Difference among general solution, singular solution and particular solution. 2 To find the solutions of first and second order differential equations. **3** Revision and Test
3.	September	1st Week And 2ndWeek 3rd Week And 4th Week Last Week	**1.** The plotting of family of solutions of differential equations of first, second and third order. 2 To find the solution of differential equations using method of variation of parameters 3 Revision
4.	October	1st Week And 2ndWeek 3rd Week And 4th Week	1. To find the solutions of linear differential equations of second order using built in functions of Python software. **2** To find numerical solution of a first order ODE using built in functions of Python.
5.	November	1st Week And 2ndWeek 3rd Week And 4th Week	1. To find numerical solution of a first order PDE using built in functions of Python. 2 Revision