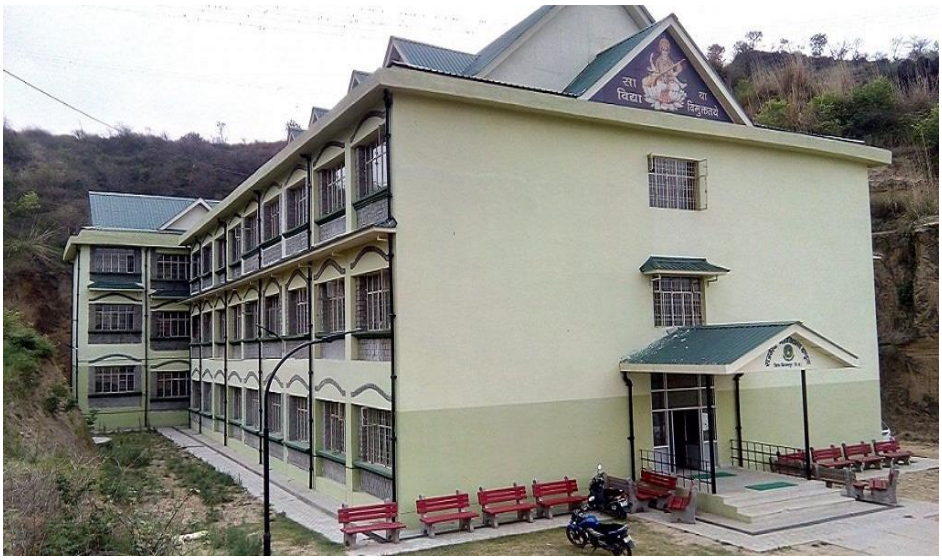
Programme Outcomes (PO)

Programme Specific Outcomes (PSO)

Course OutComes (CO)

Department of Mathematics



Govt. College Jhandutta Distt. Bilaspur (H.P.)

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Department of Mathematics	After successful completion of three-year degree program in Mathematics a student should be able to;
Programme Outcomes (PO) B.Sc. (Mathematics)	PO-1. Gain knowledge and skill in the fundamentals of Mathematics. PO-2. Students will effectively communicate topics related to the mathematical sciences in written form. PO-3. Students will recognize problem solving techniques appropriate to a given situation, including the development of mathematical models, the identification of assumptions, the understanding of the limitations of models, and the use of both graphical and numerical methods. PO-4. Students will be able to recognize, understand, and analyze material related to the mathematical sciences from written sources. PO-5. Students demonstrate an understanding of commonly used facts, formulas, terminology, and definitions. PO-6. Students can write well-constructed and logical mathematical proofs. PO-7. Students will be able to self-assess their academic growth.
Programme Specific Outcomes (PSO) B.Sc. (Mathematics)	PSO-1. Gain the knowledge of Mathematics through theory and practical. PSO-2. The ability to assess and interpret complex situations, choose among several potentially appropriate mathematical methods of solution, persist in the face of difficulty, and present full and cogent solutions that include appropriate justification for their reasoning. PSO-3. Students will understand the basic rules of logic, including the role of axioms or assumptions PSO-4. Develop research-oriented skills. PSO-5. Understand and be able to articulate the differences between inductive and deductive reasoning.

Course Outcomes (CO)
B.A./B. Sc. (Mathematics) First Year

Course	**Outcomes**
DIFFERENTIAL CALCULUS MATH102TH	The students will be well conversant with the following types of differential calculus: • CO-1. Basic theory of differential calculus. • Limit and Continuity, Types of discontinuities. • Differentiability of functions. • Indeterminate forms, Rolle's Theorem. • Concavity, Convexity & Points of Inflexion. Maxima and Minima with Lagrange Multipliers Method (two variables), Jacobian (upto three variables).
DIFFERENTIAL EQUATIONS MATH102TH	The students will be well conversant with the following types of differential equations:

	• Basic theory of linear differential equations, Wronskian, and its properties. First order exact differential equations. Integrating factors, rules to find an integrating factor. • Methods for solving higher-order differential equations. Solving a differential equation by reducing its order. Linear homogenous equations with constant coefficients, Linear nonhomogenous equations. • The method of variation of parameters with constant coefficients. The Cauchy-Euler equation and Legendre equation. Simultaneous differential equations, Total differential equations. • Order and degree of partial differential equations, Concept of linear and non-linear partial differential equations.Formation of first order partial differential equations (PDE). • Linear partial differential equation of first order, Lagrange's method. Classification of second order partial differential equations into elliptic, parabolic and hyperbolic through illustrations only.
B.A/B.SC 2nd Year	
Real Analysis MATH201TH	On completion of this unit of the course, the student will be able to develop a clear-cut idea on sequence and series of functions defined on a set after covering the following: • Sequence of functions defined on a set, Point wise and uniform convergence. Cauchy 1st Theorem and 2nd Theorem, Cauchy criterion of uniform convergence. Weirstrass' M-test. • Series of functions defined on a set, Point wise and uniform convergence. Cauchy criterion of uniform convergence. Weierstrass' M-test. • Power series: Fundamental theorem of power series. Cauchy-theorem. Determination of radius of convergence. Uniform and absolute convergence of power series.
Algebra MATH202TH	Students will get an overall understanding of the following concepts: • Elementary properties using definition of Group. Definition and examples of subgroups. • Definitions and examples of Ring, Field. • Concept of Vector space over a Field. • Basic theorems of homomorphism • Rings of matrices
Integral Calculus MATH309TH	Students will get an overall understanding of the following concepts: • Evaluation of definite integrals. • Integration as the limit of a sum. • Reduction formulae for integrals. • Definition of Improper Integrals: Statements of (i) μ-test (ii) Comparison test - Simple problems only. Use of Beta and

	Gamma functions. • Working knowledge of double integral. • Applications in Rectification, Quadrature, volume and surface areas of solids formed by revolution of plane curve and areas problems only.
Vector Calculus MATH310TH	Students will get an overall understanding of the following concepts: • Scalar and vector product of three vectors. Product of four vectors. Reciprocal vectors. Vector differentiation, Scalar valued point functions, vector valued point functions. • Gradient of a scalar point function. Divergence and curl of a vector point function. Gradient, Divergence and curl of sums and products. • Orthogonal curvilinear coordinates. Conditions for orthogonality. Fundamental triads of mutually orthogonal unit vectors. Gradient, Divergence, Curl and Laplacian operators in terms of orthogonal curvilinear coordinators. • Translation, Dilation, Rotation, Reflection in a point, line and plane. Matrix form of basic geometric transformations. Interpretation of eigenvalues and eigen vectors for such transformations and eigen spaces as invariant subspaces.
B.A./B.Sc. 3rd Year	
Matrices MATH 301TH	Students will get an overall understanding of the following concepts: • Types of matrices. Rank of a matrix. Invariance of rank under elementary transformations. Reduction to normal form, Solutions of linear homogeneous and non-homogeneous equations with number of equations and unknowns up to three. • Matrices in diagonal form. Reduction to diagonal form upto matrices of order 3. Computation of matrix inverses using elementary row operations. Rank of matrix. • Definition of Vector space, R, R2, R3 as vector spaces over R, Concept of Linear dependence/Independence, Standard basis for R, R2, R3, Examples of different bases. Subspaces of R2, R3. • Translation, Dilation, Rotation, Reflection in a point, line and plane. Matrix form of basic geometric transformations. Interpretation of eigenvalues and eigen vectors for such transformations and eigen spaces as invariant subspaces.
Numerical Methods MATH304TH	The student will get an overall idea of • To find a real root of an algebraic or transcendental equation. Location of root (tabular method), Bisection method, Newton-Raphson method with geometrical significance, Numerical Problems.

	• Newton's Backward interpolation Formula, Lagrange's Interpolation Formula. • Numerical differentiation, Central difference method • Numerical Integration: Trapezoidal and Simpson's one-third formula (statement only). Problems on Numerical Integration.
Probability and Statistics MATH313TH	After completion of this course, the students will be able to understand & apply the concepts of probability & statistics covered in the following Units: • Random experiment, Sample space, probability as a set function, probability axioms, probability space. Finite sample spaces. Conditional probability, Bayes theorem, independence. • Real random variables (discrete and continuous), cumulative distribution function, probability mass/density functions, mathematical expectation, moments, moment generating function, characteristic function. • Discrete distributions: uniform, binomial, Poisson, geometric, negative binomial, Continuous distributions: uniform, normal, exponential. • Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions, expectation of function of two random variables, moments, covariance, correlation coefficient, independent random variables, joint moment generating function. • Measures of central tendency and measures of dispersion, moments, skewness and kurtosis.
Theory of Equations MATH316TH	After completion of this course, the students will be able to understand & apply the concepts of probability & statistics covered in the following Units: • General properties of polynomials, Graphical representation of a polynomials, maximum and minimum values of a polynomials, General properties of equations. • Descarte's rule of signs for positive and negative roots, Relation between the roots and the coefficients of equations. • Symmetric functions, Applications symmetric function of the roots, Transformation of equations. Solutions of reciprocal and binomial equations. Algebraic solutions of the cubic (Carden's method) and biquadratic (Descarte's & Ferrari's method). Properties of the derived functions