B.A./B.Sc. Mathematics	
CBCS(Honours)	
Semester-I	
MAT-HC-1016 Calculus	• Students will understand the concept of double and triple integrations with its application to compute area, volume, surface area of solid object, arc length of curve etc. • Students will learn the applications of calculus in business, economics and life science.
MAT-HC-1026 Algebra	• This course will increase the logical thinking capacity of students in practical life • Students will also learn the applications of system of linear equations in economics, chemistry etc.
Semester-II	
MAT-HC-2016 Real Analysis	• Students will be able to learn different properties of real line such as algebraic and ordered properties. • Student will also learn the concepts of sequence and series and their convergence.
MAT-HC-2026 Differential Equation	• Students will learn the basic concepts of differential equations for formulation of mathematical modeling • Student will learn to solve 1st and higher order differential equations.
Semester-III	
MAT-HC-3016 Theory of Real Functions	• Students will be able to learn the concept of limit, continuity, differentiability of function and their properties.
MAT-HC-3026 Group Theory- I	• Students will learn the fundamental of groups and symmetrical figures. • Students will also learn langrange's theorem, Farmat's theorem and concepts of group homomorphism.
MAT-HC-3036 Analytical Geometry	• Students will learn the basic tools of 2-D and 3-D coordinate system, general conics etc.
MAT-SE-3014 Computer Algebra System and Related Software	• Use of softwares; Mathematica /MATLAB/ Maxima/Maple etc. as a calculator, for plotting functions and animations

	• Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and eigenvectors. • Understand the use of the statistical software **R** as calculator and learn to read and get data into **R.**
MAT-SE-3024 Combinatorics and Graph Theory	• Students will learn the basic method of counting, pigeon hole principle and their applications • Students will also learn Basics of graph theory
Semester-IV	
MAT-HC-4016 Multivariate Calculus	• Students will learn limit, continuity and partial derivative of multivariable function. • Students will learn the application of double and triple integrals and their applications.
MAT-HC-4026 Numerical Methods	• Students will learn the concepts of interpolation, numerical differentiation and integration. • Students will learn different methods such as bisection method, Regula-falsi method, NewtonRaphson's method to solve algebraic and transcendental equation
MAT-HC-4036 Ring Theory	• Students will learn the fundamental theory of rings and their corresponding homomorphism • Students will learn different kind of ring structures like polynomial ring, integral domains, Euclidean domain and their properties.
MAT-SE-4014 R-Programming	• Become familiar with **R** syntax and to use **R** as a calculator. • Understand the concepts of objects, vectors and data types. • Know about summary commands and summary table in **R**. • Visualize distribution of data in **R** and learn about normality test. v) Plot various graphs and charts using **R**.
MAT-SE-4024 Latex and HTML	• Students will learn typeset of mathematics using latex, how to

	create beamer presentation and web page using html.
Semester-V	
MAT-HC-5016 Riemann Integration and Metric Space	• Student will learn improper integrals including beta, gamma functions, know the concepts of Riemann integration, metric spaces, limit point of a set, continuity in metric space and banach fixed point theorem.
MAT-HC-5026 Linear Algebra	• Students will learn the concepts of linear dependence/ independence of vectors, basic concepts of linear transformations, basis of a vector space. • Students will also learn how to compute eigen values, eigen vectors of matrices and Inner product space.
MAT-HE-5016 Number Theory	• Students will learn properties of prime numbers and some of the open problems in number theory. • Students will also learn about number theoretic functions • Students will be able to solve linear , quadratic and system of linear congruence equations.
MAT-HE-5026 Mechanics	• Students will learn the concepts in statics such as couples, moments, equilibrium in 2D and 3 D. • Students will also learn conservation of mechanical energy, translational, rotational motions of rigid bodies.
MAT-HE-5036 Probability and Statistics	• Students will learn about probability density and moment generating functions • Students will learn about various distributions such as Benoulli, Bionomial, Poisson, Gamma, Exponential distributions. Students will also learn correlation and linear regression, central limit theorem.
MAT-HE-5046 Linear Programming	• Students will learn basics concepts of Simplex Method, Big -M method, Two phase method, Duality problems, Primal Problems, Fundamental theorem of duality.
MAT-HE-5056 Spherical Trigonometry and Astronomy	• Learn about the properties of spherical and polar triangles • know about fundamental formulae of spherical triangles

	• learn about the celestial sphere, circumpolar star, rate of change of zenith distance and azimuth • learn about Keplar's law of planetary motion, Cassini's hypothesis, differential equation for fraction
MAT-HE-5066 Programming in C	• Understand and apply the programming concepts of C which is important to mathematical investigation and problem solving. • Learn about structured data-types in C and learn about applications in factorization of an integer and understanding Cartesian geometry and Pythagorean triples. • Use of containers and templates in various applications in algebra. • Use mathematical libraries for computational objectives. • Represent the outputs of programs visually in terms of well formatted text and plots.
Semester-VI	
MAT-HC-6016 Complex Analysis	• Students will learn the concepts of limit, continuity, differentiability of complex variable functions to understand Cauchy- Riemann equations. • Students will also learn how to evaluate contour integrals, Cauchy-Goursat theorem, cauchy's integral formula.
MAT-HC-6026 Partial Differential Equations	• Students will learn how to formulate classify and transform 1 st order PDE into canonical form. • Students will also learn different method of 1^{st} and 2^{nd} order differential equations.
MAT-HE-6016 Boolean Algebra and Automata Theory	• Learn about the order isomorphism, Hasse diagrams, building new ordered set. • Learn about the algebraic structure lattices, properties of modular and distributive lattices. • Get ideas about the Boolean algebra, Switching circuits and applications of switching circuits. • Appreciate the theory of automata and

	its applications
MAT-HE-6026 Bio-Mathematics	• Learn the development, analysis and interpretation of bio mathematical models such as population growth, cell division, and predator-prey models. • Learn about the mathematics behind heartbeat model and nerve impulse transmission model. • Appreciate the theory of bifurcation and chaos. • Learn to apply the basic concepts of probability to molecular evolution and genetics
MAT-HE-6036 Mathematical Modelling	• Know about power series solution of a differential equation and learn about Legendre's and Bessel's equations. • Use of Laplace transform and inverse transform for solving initial value problems. • Learn about various models such as Monte Carlo simulation models, queuing models, and linear programming models.
MAT-HE-6046 Hydromechanics	• Know about Pressure equation, rotating fluids. • Learn about Fluid pressure on plane surfaces, resultant pressure on curved surfaces, Gas law, mixture of gases • Learn about the Eulerian and Lagrangian method. • Learn about equation of continuity, examples, acceleration of a fluid at a point
MAT-HE-6056 Rigid Dynamics	• Students will learn moment and product of inertia of a body, D' Alembert's principle, motion of a body in 2D and Lagrange's equations.
MAT-HE-6066 Group Theory II	• Learn about automorphisms for constructing new groups from the given group. • Learn about the fact that external direct product applies to data security and electric circuits. • Understand fundamental theorem of finite abelian groups. • Be familiar with group actions and conjugacy in S_n.

	• Understand Sylow theorems and their applications in checking non-simplicity
MAT-HE-6076 Mathematical Finance	• Know the basics of financial markets and derivatives including options and futures. • Learn about pricing and hedging of options, as well as interest rate swaps. • Learn about no-arbitrage pricing concept and types of options. • Learn stochastic analysis (Ito formula, Ito integration) and the Black−Scholes model. • Understand the concepts of trading strategies and valuation of currency swaps.
CBCS (Honours Generic & Regular)	
Semester I	
MAT-HG-1016/MAT-RC-1016 Calculus	• Students will learn the concepts of limit, continuity and differentiability • Students will learn applications of derivatives and partial differentiations.
MAT-HG-1026 Analytical Geometry	• Students will learn the basic tools of 2-D and 3-D coordinate system, general conics etc.
Semester II	
MAT-HG-2016/MAT-RC-2016 Algebra	• Students will learn cubic and bi quadratic equation, concept of consistency of a system of linear equations, Eigen value, eigen vector • Students will also learn the group, ring and vector space.
MAT-HG-2026 Discrete Mathematics	• Students will learn the notation of ordered sets and maps between ordered sets • Students will also be familiar with Boolean algebra, switching circuits and their applications.
Semester III	
MAT-HG-3016/MAT-RC-3016 Differential Equations	• Students will learn the basic concept of differential equations for formulation of mathematical modeling. • Student will learn to solve 1st and higher order differential equations.
MAT-HG-3026 Linear Programming	• Students will learn basics concepts of Simplex Method, Big -M method, Two phase method.

Semester IV	
MAT-HG-4016/MAT-RC-4016 Real Analysis	• Students will be able to learn different properties of real line such as algebraic and ordered properties. • Student will also learn the concepts of sequence and series and their convergence
MAT-HG-4026 Numerical Analysis	• Students will learn the concepts of interpolation, numerical differentiation and integration • Students will learn different methods like Newton's forward/backward difference, interpolation formula etc