Sher Shah College,Sasaram
Department of Mathematics

PROGRAM OUTCOMES (PO)

After the completion of B.Sc. Honours Degree Programme, the students will be able to:

PO1: At the end of the course the students are capable of applying mathematical modeling as required in various subjects such as physical sciences, economics and business studies.

PO2: The students are capable of expressing and formulating applied problems in terms of mathematical and statistical languages.

PO3: The students are able to use computational and algorithmic versions to solve real life problems.

PO4: The students study mathematical logic which develops the spirit of analytical thinking in them.

PO6: Demonstrate analytical skill and proficiency in a range of tools and techniques used in research and analysis in science.

PO7: Show proficiency in professional, employability and soft skills required for higher education and placements.

PROGRAM SPECIFIC OUTCOMES (PSO)

Upon completion of the programme, the student will attain the ability to:

PSO1: Develop basic concepts of the topic taught, which will help them in solving problems related to the topic and uplift their analytical abilities require to pursue higher studies of their choice so that they can achieve higher academic excellence.

PSO2: Apply the concepts to various fields such as Bio-Mathematics, Environmental science, Mathematical Finance, Mathematical Economics, Actuarial Science, Industrial Mathematics, Medical Sciences etc.

PSO3: Apply well equipped at different competitive examinations for higher studies in Mathematics. They also become eligible for public service examinations and other employment related examinations.

PSO4: Develop skills in problem solving, critical thinking and analytical reasoning.

PSO5: Develop logical capacity to great extent which will lay down a firm foundation of the fundamental concept.

PSO6: Gain advanced knowledge on topics in pure and applied Mathematics empowering the student to pursue higher degrees at reputed academic Institutions

COURSE OUTCOME
B.Sc. PART -1(HONOURS)
PAPER – I

Course Outcomes:

After the completion of the course, the student will be able to:

CO1: Students will learn and able to solve complete set theory, with its properties like General forms of Demorgan's laws Generalized Cartesian product, Equivalence relation, Partial and total order relation. Countable and uncountable sets, countability of real, rational, irrational and algebraic number system, composition and factorization of mappings.

CO2: Students will learn and able to solve Trigonometry with its properties like Hyperbolic functions, Resolution into factors. Summation of series, (C+is) method only and Gregory's series.

CO3: Students will learn and able to solve Matrices with its properties like Symmetric and Skew-symmetric matrices, Hennitian and skew- Hennitian matrices. Transpose, Adjoint and inverse of matrix. Orthogonal matrices, Rank of matrix.

CO4; Students will learn and able to solve Linear Programming with its properties like Convex set and their properties, Linear Programming Problems and their graphical solutions, Theory of Simplex method and their simple applications. Transportation problem, Assignment problems.

CO5: Students will learn and able to solve Theory of Equations with its properties like Fundamental theorem of Algebra, Relation between roots and Coefficients of a Polynomials equations. Evaluation of Symmetric Functions of roots, Cardon's Solution of a Cubic, Euler's solution of a biquadratic equation. Descartes rule of sign.

COURSE OUTCOME
B.Sc. PART -1(HONOURS)
PAPER – II

Course Outcomes:

After the completion of the course, the student will be able to:

CO1: Students will learn and able to solve Differential calculus and its properties like Successive differentiation, Leibnitz's theorem, partial Differentiation, Euler's theorem, Exact differential, Indeterminate form, L. Hospital's rule, McLaren's and series expansion, Tangents and Normal's, Curvature, Asymptotes,

CO2: Students will learn and able to solve Integral Calculus and its properties like Integration of rational and Irrational function, Notion of Integral as limit of a sum, Evaluation of definite integrals, etc.

CO3: Students will learn and able to solve Analytical Geometry of Two Dimensions and its properties like

System of Circles, Change of axes, condition for the general equation of second degree to represent Parabola, ellipse and hyperbola, etc.

CO4: Students will learn and able to solve Analytical Geometry of Three Dimensions and its properties like Rectangular, Spherical, Polar and cylindrical co-ordinates, Sphere cone and cylinder, etc.

Course Outcomes:

After the completion of the course, the student will be able to:

CO1: Students will learn and able to solve real analysis and its properties like Dedkind's Theory of real numbers and algebraic order properties of real number, archmedian properties of real numbers etc.

CO2: Students will learn and able to solve continuity and discontinuity and differentiability of function in different context.

CO3: Students will learn and able to Gain knowledge about expansions using Roller's and Taylor's theorem and Macuvourins series of elementary.

CO4: Students will learn and able to Understand theorems associated with differentiability and their applications.

CO5: Students will learn and able to solve the infinite series and their convergence like comparison Test , Rabbe test, Leibniz Test , Gauss Test , etc.

CO6: Students will learn and able to solve the abstract algebra and its properties like Binary operation, notion of a group, abelian and non-abelian groups, Order of an element, Lagrange's Theorem, Group of residue classes,' permutation group, Cayley's theorem, Homomorphism and isomorphism of groups' Kernel of a group, Homomorphism and isomorphism theorems for groups, factor group,' fundamental theorem.

COURSE OUTCOME
B.Sc. PART -II(HONOURS)
PAPER – IV

Course Outcomes:

After the completion of the course, the student will be able to:

CO1: Students will learn and able to solve differential equations, Separation of variables, Homogeneous equations. Exact Differential Equations of 1st order but not of the first degree, orthogonal trajectory, singular solution. Linear differential Equations of 2nd order with constant co-efficient' Complementary functions and particular integrals. Application of differential equations.

CO2: Students will learn and able to solve vector calculus and its properties like product of three and four vectors, Differentiation of a vector point function, Moment of a localized vectors and scalar and vector products etc.

CO3: Students will learn and able to solve statics (Via Vectors) and reduction of a force system to a force and a couple, Equation of the resultant, etc.

CO4: Students will learn and able to solve dynamics and its properties like Simple Harmonic Motion, Simple Pendulum, Elastic Springs and springs, Hooke's law, Component Velocities and acceleration. Cartesian redial and transverse velocities and acceleration, tangential and normal velocities and acceleration Newton Laws of gravitation and planetary orbit, Keplar's Laws of planetary motion.

Course Outcomes:

After the completion of the course, the student will be able to:

CO1: Students will learn and able to solve real analysis and its properties like Function of two variables, Repeated limits, Moore-osgood Theorem. Continuity and differentiability of function of two variables, yongs and Schwartz Condition of equality, Implicit function theorem, Continuity and differentiability of functions of two variables. Taylor's theorem, maxima & Minima of two variables.

CO2: Students will learn and able to solve RIEMANN INTEGRATIONS and its properties like definitions and Existence of R-integrals of bounded functions, Darbox Condition of in egrity. Riemann integrability of continuous function and monotone functions. R-:ntegral of function with finite number of discontinuities with discontinuous point as a finite number of limit point. Mean value theorem and fundamental theorems of Integral Calculus

CO3: Students will learn and able to solve Improper integrals, convergence of an improper integral, comparison test, Dirichlets test. Beta and Gamma functions, their properties and relationship.

CO4: Students will learn and able to solve Double and triple integrals, Change of order of integration, line surface and volume integrals, Green, Gauss anti Stokes theorem etc.

CO5: Students will learn and able to solve infinite series and its properties like Sequences and series of function and their point wise convergence.

CO6: Students will learn and able to solve uniform convergence of sequence and series of function. Weistrass M-test. Uniform convergence and Continuity Dini's test, Abel's test. Dirichlel's test Uniform convergence and integration, uniform convergence and differentiation.

COURSE OUTCOME
B.Sc. PART -III(HONOURS)
PAPER – VI

After completion of the course, the student will be able to:

CO1: Gain knowledge about the fundamental concepts in ring theory such as the concepts of ideals, quotient rings, integral domains, and fields.

CO2: Learn in detail about different kinds of rings like polynomial ring, unique factorization domain, Euclidean domain etc.

CO3: Understand and compute dual spaces, dual basis, transpose of a linear transformation and its matrix in the dual basis.

CO4: Deal with the inner product spaces, operators on them, implications and their existence, orthogonal complements, Bessel's inequality with applications.

CO5: Recognize the mathematical objects that are groups and classify them as abelian, cyclic and permutation groups, etc.

CO6: Acquire knowledge related to the fundamental concepts of Groups and symmetrical figures and determine whether a given set and binary operation form a group.