Government of West Bengal
Government General Degree College at
Kharagpur-II
Department of Mathematics
Madpur, Paschim Medinipur – 721149

পশ্চিমবঙ্গ সরকার
গভর্ণমেন্ট জেনারেল ডিগ্রী কলেজ
খড়্গপুর-২
গণিত বিভাগ
মাদপুর, পশ্চিম মেদিনীপুর – ৭২১১৪৯

PROGRAM SPECIFIC OUTCOMES OF THE COURSE B.SC (GENERAL) MATHEMATICS (IN CBCS CURRICULUM)

The main objective and outcomes of this program are as follows:

PSO-1: Introduction to the world of Higher Mathematics:

This program offers the students a platform for the introduction to the vast arena of Mathematics. As a theoretical discipline, mathematics helps the students to explore the possible relationships among abstractions without concern for whether those abstractions have counterparts in the real world.

PSO-2: Expansion of the area of knowledge:

In CBCS curriculum a student can choose two elective courses of his/her choice as generic courses which help is broaden his/her knowledge.

PSO-3: Creating a problem solving mindset:

Mathematics cultivates a problem-solving mindset characterized by persistence, creativity, and flexibility. Whether it's tackling a challenging calculus problem or analyzing data sets, students in general mathematics courses learn to approach problems systematically, explore multiple strategies, and adapt their approaches as needed—a mindset that is valuable both inside and outside the classroom.

PSO-4: Boost Analytical thinking:

Study of mathematical logic helps the students to develop the spirit of analytical thinking in them.

PSO-5: Employment and Career:

This program is expected to inculcate the ability to find jobs in intelligence analysis, optimization, statistical analysis, mathematical logic support, financial analysis, market research, management

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consultant, IT, software engineering, computer programming, teaching, banking, etc.

PSO-6: Global language:

Mathematics serves as a universal language that transcends cultural and linguistic barriers. It provides a common framework for communication and collaboration among people from diverse backgrounds, facilitating global cooperation and understanding.

PSO-7: Digital literacy:

In an increasingly digital world, mathematical concepts and tools are integral to understanding and leveraging technology effectively. Students in general mathematics courses gain proficiency in using mathematical software, programming languages, and computational tools, enhancing their digital literacy and technological skills.

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COURSE OUTCOMES OF THE COURSE B.SC (GENERAL) MATHEMATICS IN CBCS CURRICULUM:

SEMESTER-I	
Course Name	**Outcomes**
DSC-1A: Differential Calculus	*Students will learn the basic concepts of* *(i) Limit and Continuity, Types of discontinuities* *(ii) Differentiability of functions, Successive differentiation, Leibnitz's theorem* *(iii) Partial differentiation, Euler's theorem on homogeneous functions. Tangents and Normals, Curvature, Asymptotes, Singular points* *(iv) Tracing of curves.* *(v) Rolle's theorem, Mean Value theorems, Lagrange and Cauchy theorems. Taylor's theorem with Lagrange's and Cauchy's forms of remainder* *(vi) Power series and its convergences. Taylor's series, Maclaurin's series* *(vii) Maxima and Minima, Indeterminate forms.*
SEMESTER-II	
DSC-1B: Differential Equation	*The objective of this course is to introduce the concept of* *(i) First order exact differential equations. Integrating factors, rules to find an integrating factor.* *(ii) Methods for solving higher order differential equations. Basic theory of linear differential equations* *(iii) Wronskian, and its properties. Solving a differential equation by reducing its order* *(iv)Linear homogenous equations with constant coefficients, Linear non-homogenous equations, The method of variation of parameters,* *(v)The Cauchy-Euler equation, Simultaneous differential equations* *(vi) Order and degree of partial differential equations, Concept of linear and non-linear partial differential equations* *(vii) Formation of first order partial differential equations, Linear partial differential equation of first order, Lagrange's method, Charpit's method* *(viii) Classification of second order partial differential equations into elliptic, parabolic and hyperbolic through illustrations only.*
SEMESTER-III	
DSC-1C :RealAnalysis	*It provides the concepts of* *(i) Finite and infinite sets, Bounded set, Archimedean property of R* *(ii) Cauchy convergence criteria for sequence, Infinite series* *(iii)Sequence and series of function, Pointwise and Uniform convergence* *(iv) Power series and radius of convergence*

SEC1T: Boolean algebra	*Through this course of study, student will learn about the following* *(i) Definition, examples and basic properties of partially ordered sets,* *(ii) Hasse – diagram, maps between ordered sets, duality principle, maximal and minimal elements, lattices as ordered sets, complete lattices, lattices as algebraic structures, sub lattices, products and homo morphisms.* *(iii) Definition, examples and properties of modular and distributive lattices, Boolean algebras, Boolean polynomials, minimal forms of Boolean polynomials, Quinn McCluskey method, Karnaugh diagrams, switching circuits and applications of switching circuits.*
SEMESTER-IV	
DSC-1D: Algebra	*The main objective of this course is to provide the knowledge of* *(i) Groups and examples of abelian and non-abelian groups* *(ii) Cyclic groups from number systems* *(iii) Subgroups, cyclic subgroups, the concept of a subgroup generated by a subset* *(iii) Cosets, Index of subgroup, Lagrange's theorem, order of an element, Normal subgroups: their definition, examples, and characterizations* *(iv) Quotient groups.* *(v) Concepts of rings* *(vi) Subrings and ideals, Integral domains and fields, examples of fields: Zp, Q, R, and C. Field of rational functions.*
SEC2T: Integral Calculus	*This course provides the concepts of* *(i)Integration of functions , properties of definite integrals.* *(ii)Reduction formulae* *(iii)Evaluation of area and volumes, lengths of curves in the plane* *(iv)Double and triple integrals* *(v)Valuation of volumes and surface of solids of revolution.*
SEMESTER-V	
DSE -1A: Linear Algebra	*The key outcomes of this course are to provide the knowledge of* *(i) Vector spaces, subspaces, algebra of subspaces* *(ii) Quotient spaces, linear combination of vectors, linear span, linear independence, basis and dimension, dimension of subspaces* *(iii) Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations* *(iv) Isomorphisms, Isomorphism theorems, invertibility and isomorphisms, change of coordinate matrix.*
SEC3T: Number Theory	*This course provides the concepts of* *(i)Elementary number theory including diophantine equation, prime counting theorem etc.* *(ii)Number theoretic functions including Euler Phi-function,*

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	Dirichlet function, Mobius function etc.
SEMESTER-VI	
DSE2T: Numerical Methods	*This course is designed to provide the knowledge of* *(i) Algorithms, Convergence, Bisection method, False position method, fixed point iteration method, Newton's method, Secant method, LU decomposition, Gauss-Jacobi, Gauss-Siedel and SOR iterative methods* *(ii) Lagrange and Newton interpolation: linear and higher order, finite difference operators. Numerical differentiation: forward difference, backward difference and central Difference* *(iii) Integration: trapezoidal rule, Simpson's rule* *(iv) Solving ordinary differential equations: Euler's method. Runge – Kutta method of second and fourth order, Prediction – correlation methods.*
SEC-4: Probability and Statistics	*From this course, the students will understand the concepts of* *(i) Sample space, probability axioms, real random variables (discrete and continuous), cumulative distribution function, probability mass/density functions* *(ii) Mathematical expectation, moments, moment generating function, characteristic function, discrete and continuous distributions* *(iii) Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions* *(iv) Expectation of function of two random variables, conditional expectations, independent random variables.*

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