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

পশ্চিমবঙ্গ সরকার
গভর্নমেন্ট জেনারেল ডিগ্রী কলেজ খড়গপুর-২
গণিত বিভাগ
মাদপুর, পশ্চিম মেদিনীপুর – ৭২১১৪৯

PROGRAM SPECIFIC OUTCOMES OF THE COURSE B.SC (GENERAL) MATHEMATICS (IN 3 TIER EXAMINATION PATTERN) (W.E.F. 2014-2015):

The program specific outcomes of B.Sc (General) Mathematics program are as follows:

PSO1: : A student should be able to explore basic facts of mathematics and should be able to gain the knowledge of elementary conventions such as notations , terminology etc.

PSO2: Students will get the foundation in basic Mathematics viz., Algebra, Geometry and Analysis and their applications in various fields of knowledge are the main focus of the program.

PSO3: The present course of study may boost analytical thinking among the students.

PSO4: The students might be able to establish the interconnections among different branches of Mathematics.

PSO5: It will strengthen theoretical understanding through problem solving among the students.

PSO6: Students may acquire sufficient knowledge for pursuing higher studies in Mathematics as well as other branches of science.

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HEAD
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Kharagpur-II, Madpur
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COURSE OUTCOMES OF THE COURSE B.SC (GENERAL) MATHEMATICS IN 3 TIER EXAMINATION PATTERN) (W.E.F. 2014-2015):

PART-I: PAPER-1

Course Name	Outcomes
Group-A: Classical Algebra	From this course students will learn the basic concepts of (i) Complex Numbers and its theory and applications (ii) Polynomials with real coefficients, n-th degree polynomial equation has exactly n roots. Nature of roots of an equation, Transformation of polynomial equation. Cardan's method of solution of a cubic equation, solution of biquadratic equation by Ferrari's method. (iii) Basic aspects of Determinant and its applications (iv) Theory of Matrices, finding Rank of the matrices, solution of a system of linear equations with not more than three variables by matrix method (not involving ranks).
Group-B: Modern Algebra	The objective of this course is to introduce the following concepts (i) Basics of set theory and its applications. It also gives the introductory knowledge the concepts of various types of mapping and binary operation on a set. (ii) Students will be able to understand the basic Group theory and its examples Also they will be able to solve the related problems taken from various branches. (iii) Further the students will be acquainted with the concept of Ring theory including sub-ring and Integral Domain. Also they will be able to understand the basics of Field theory. (iv) Characteristic equation of a square matrix, determination of Eigen values and Eigen vectors. Statement and illustration of Cayley - Hamilton theorem.
Group-C: Analytical Geometry	This portion of the syllabus is intended to provide the students with the following concepts. (i) Geometry of two dimensions including polar equations of straight lines and circles, polar equation of a conic, tangent and normal. (ii) It also includes transformations of rectangular axes: Translation, rotation and their combinations. General equation of second degree and concepts of pair of straight lines are also introduced. (iii) Further it includes Geometry of three dimensions. It gives the students the knowledge of rectangular Cartesian co-ordinates in space, planes, lines, skew lines, spheres, cylinder, cones.
Group-D: Vector Algebra	Through this course of study, student will learn the concepts of Collinear and coplanar vectors, scalar and vector product of two vectors, scalar triple product of three vectors and its geometrical interpretation, simple application to geometry with the notion of vector equations of straight lines and planes.

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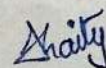Kharagpur-II, Madpur
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PART-II: PAPER-2

Group – A: Differential Calculus	The key outcomes of this course are to provide the students with the knowledge of the following (i) Real number system (ii) Sequence of real numbers, concept of limit of a sequence, types of sequences and its convergence. (iii) Series of real numbers, its convergence and divergence, Cauchy's convergence Principle, Geometric series and p-series and their convergence. D'Alembert ratio test, Cauchy's nth root test and Raabe's test. Simple applications are also included. (iv) Function of a single real variable, continuity of a function, derivatives, successive derivatives, mean value theorems. (v) Students will also learn function of two variables, their geometrical interpretation, limit, repeated limit and continuity. Concepts partial differentiation and homogeneous functions. (vi) Students can also learn the applications of the theory through solving the problems on based on geometry.
Group – B: Integral Calculus	From this course, the students will be able to learn the following: (i) Definite and indefinite integration, reduction formulas (ii) Improper integrals, Beta and Gamma functions (iii) Double and triple integrals and the use of Jacobian (iv) Application of integral calculus in solving the problems related to Rectification, Quadrature, Volumes and surface area of solids formed by revolution of curves and area.
Group – C: Differential Equations	From this course, the students will understand the concepts of (i) First order linear and non-linear differential equations and its application. (ii) Second order linear differential equations with constant coefficient, linear homogeneous second order differential equations. (iii) Eigen value problems.

PART-II: PAPER-3

Course Name	Outcomes
Group-A: Linear Programming	From this course, the students will be able to learn (i) Formulation of linear programming and its solution (ii) Types of solution and concepts of hyper-plane, convex set, extreme points, convex hyper-plane and statement of relevant theorems. Statement of the fundamental theorem of L.P.P. (iii) Duality theory. Definition of Transportation problem and assignment problem and their connection with L.P.P., algorithmic solution of T.P. and A.P.

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Course Name	Outcomes
Group B: Numerical Analysis	From this course, the students will be able to learn the following: (i) Polynomial Interpolation and applications (ii) Differences: Forward, backward and divided difference tables (iii) Numerical integration (iv) Solution of equations (algebraic and transcendental) by popular numerical methods. (v) Geometrical interpretation of these methods. Convergence of Iteration- and Newton-Raphson method.

PART-II: PAPER-3

Course Name	Outcomes
Group-C: Analytical Dynamics	From this course, the students will be able to learn (i) Impulse and impulsive forces, work, power and energy, principles of conservation of energy and momentum, collision of elastic bodies. (ii) Motion in a straight line under variable forces, damped, forced and damped forced vibration, motion under inverse square law (iii) Motion in a plane, equations of motion in cartesian and polar coordinates, central orbits, escape velocity.

PART-III: PAPER-4

Course Name	Outcomes
Group-A: Elements of Computer Science	From this course, the students can get the basic concepts of : (i) Computers and their functions e.g., information processing, history of data processing machines, Digital Computer, components and their functions and interactions input: storage, control, arithmetic logic and output systems, analogy between the working of a clerk and computer, analog and digital computers etc. (ii) Elementary Computers Programming e.g., concepts of machine language, assembly language, different higher level languages and compilers, Fixed and floating point models, constants and variables, subscripted variables, arithmetic expression, Library functions. (iii) Programming in FORTRAN – 77. (iv) Writing computer oriented algorithm, Flow-chart. Writing on a coding sheet and computer programmes in FORTRAN for the solution of simple computational problems related to algebra and numerical methods. (v) Boolean Algebra and Applications.

Group-B: Probability and Statistics	Through this course, students will be able to learn (i) Basics of Probability Theory including the theorem of total probability and Bayes' theorem, independent event and independent trials, random variable and its probability distribution, expectation and variance. Joint, marginal and conditional distribution. (ii) Elements of basic statistics with concepts of measures of dispersion, Skewness and Kurtosis, moments and $\beta 1$ and $\beta 2$ coefficients. Binomial, Poisson and normal distribution. Correlation and regression, estimation of parameters, maximum likelihood method, interval estimation.

Officer – In –Charge
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Officer-in-charge
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Paschim Medinipur-721149

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