Government General Degree College Chapra
Curriculum Plan under NEP 2020
Department of Mathematics
B.Sc Mathematics (Major Course)
Semester- I

Semester	**Period of Semester**	**Course Code**	**Name of the Faculty**	**Paper Name**	**Brief Description of the Topic**	**Number of Lecture**
SEM- I	July-December	MATH-M-T-01	Biswajit Paul	Calculus & Analytical Geometry	Hyperbolic functions and its derivative, higher order derivatives, Leibnitz rule and its applications to problems of type e^{ax+b}sinx, $e^{ax+b}cosx$, $(ax+b)^n sinx$, $(ax+b)^n cosx$. Pedal equations. Curvature, radius of curvature, centre of curvature, circle of curvature Asymptotes Envelopes. Singular points, concavity and inflection points. Curve tracing in Cartesian coordinates, tracing in polar coordinates of standard curves. L'Hospital's rule, applications in business, economics and life sciences.	25 L

			Dr. Asim Kumar Das	Calculus & Analytical Geometry	Reduction formulae, derivations and illustrations of reduction formulae of the type $\int sin^n x\, dx$, $\int cos^n x\, dx$, $\int tan^n x\, dx$, $\int sec^n x\, dx$, $\int (log\ x)^n x\, dx$, $\int sin^n x\, cos^m x\, dx$ Parametric equations, parameterizing a curve, arc length of a curve, arc length of parametric curves, area under a curve, area and volume of surface of revolution, techniques of sketching conics.	16L
					Plotting of graphs of function e^{ax+b}, $1/(ax+b)$, $\|ax+b\|$, sin(ax+b), cos(ax+b), log(ax+b), $e^{ax+b}cosx$, $(ax+b)^n$ and to illustrate the effect of a and b on the graph. Plotting the graphs of polynomials of degree 4 and 5, the derivative graph, the second derivative graph and comparing them. Sketching parametric curves (Eg. trochoid, cycloid, epicycloids, hypocycloid).	8 L

					Obtaining the surface of the revolution of curves. Tracing of conics in Cartesian coordinates / polar coordinates. Sketching ellipsoid, hyperboloid of one and two sheets, elliptic cone, elliptic, paraboloid, and hyperbolic paraboloid using Cartesian coordinates.	
			Dr. Aninda Chakraborty	Calculus & Analytical Geometry	Transformation of coordinate axes, pair of straight line, reflection properties of conics, rotation of axes and second-degree equations, classification of conics using the discriminant, polar equations of conics. Straight lines in 3D, sphere, cylindrical surfaces. central conicoids, paraboloids, plane sections of conicoids, generating lines, classification of quadrics, illustrations of graphing standard quadric surfaces like cone, ellipsoid.	30L
		MATH-SEC- T-01.	Biswajit Paul	Logic & Boolean Algebra	Introduction, propositions, truth table, negation, conjunction and disjunction. Implications, biconditional	15 L

					propositions, converse,contrapositive and inverse propositions and precedence of logical operators. Propositional equivalence, Logical equivalences. Predicates and quantifiers: Introduction, quantifiers, binding variables and negations.	
		.	Dr. Asim Kumar Das	Logic & Boolean Algebra	Definition, examples and basic properties of ordered sets, maps between ordered sets, duality principle. Lattices as ordered sets, lattices as algebraic structures, sublattices, products and homomorphisms.	10 L
			Dr. Aninda Chakraborty.	Logic & Boolean Algebra	Definition, examples and properties of modular and distributive lattices, Boolean algebras, Boolean polynomials, minimal and maximal forms of Boolean polynomials. Quinn-McCluskey method, Karnaugh diagrams, logic gates, switching circuits and applications of switching circuits.	20 L

Government General Degree College Chapra
Curriculum Plan under NEP 2020
Department of Mathematics
B.Sc Mathematics (Minor Course)
Semester- I

Semester	**Period of Semester**	**Course Code**	**Name of the Faculty**	**Paper Name**	**Brief Description of the Topic**	**Number of Lecture**
SEM - I	July - December	MATH-MI – T - 01	Biswajit Paul	Algebra & Analytical Geometry	Complex Numbers: De Moivre's theorem and itsapplications. Exponential, Sine, Cosine and Logarithm of a complex number. Definition of a^z. Inverse circular and hyperbolic functions. Polynomials: Fundamental theorem of algebra (Statement only). Polynomials with real coefficients, nature of roots of an equation (surd or complex roots occur in pairs). Statement of Descartes's rule of signs and its applications. Relation between roots and coefficients, transformations of equations. Cardan's method of solution of a cubic equation.	15 L
			Dr. Asim Kumar Das	Algebra & Analytical Geometry	Rank of a matrix: Determination of rank either by considering minors or by the sweep-out process. Consistency and solution of a system of linear equations (not more than 3 variables) by matrix method. Equivalence relations and partitions. Functions, composition of functions, invertible functions, one-to-one correspondence and cardinality of a set. Definition and elementary properties of groups. Concepts of permutation Group, alternative group, finite groups: $S3$, $V4$. The group Zn of integers under addition modulo n.	20 L

					Order of an element, order of a group, subgroups and examples of subgroups. Polar equation of straight lines and circles. Polar equation of a conic refers to a focus as a pole. Equation of chord joining two points. Equations of tangents and normals. Sphere and its tangent planes. Right circular cone.	
			Dr. Aninda Chakrabarty	Algebra & Analytical Geometry	Transformations of rectangular axes: Translation, rotation and their combinations. Invariants. General equation of second degree in x and y: Reduction to canonical forms. Classification of conics. Pair of straight lines: Condition that the general equation of 2nd degree in x and y may represent two straight lines. Point of intersection of two intersecting straight lines. Angle between two lines given by ax^2+2hxy+by^2=0. Equation of bisectors. Equation of two lines joining the origin to the points in which a line meets a conic.	15 L

Government General Degree College Chapra
Curriculum Plan under NEP 2020
Department of Mathematics
B.Sc Mathematics (Multidisciplinary Course)

Semester- I

Semester	Period of Semester	Course Code	Name of the Faculty	Paper Name	Brief Description of the Topic	Number of Lecture

SEM - I	July - December	MATH-MD – T - 01	Biswajit Paul	Basic Mathematics	Introduction to sets and their representations. The empty set, finite and infinite sets, equal sets, subsets, power set, and Universal set. Venn Diagrams, operations on sets, complement of a set, problems on union and intersection of sets. Polar representation of complex numbers. De Moivre's theorem (without proof) for rational indices and their applications. Introduction and definition of equation. Types of equations. Relation between roots and coefficients. Descartes's rule of signs. Linear and quadratic equations and their solution. Nature of the roots of quadratic equations.	15 L
			Dr. Asim Kumar Das	Basic mathematics.	Definition of a Matrix. Types of Matrices. Elementary operations on Matrices. Determinant of a square matrix (up to third order). Properties of determinants. Cofactors and minor of a determinant. Transpose and Adjoint of a matrix. Symmetric and Skew Symmetric Matrices. Inverse of a matrix. Solution of system of linear equations (up to third order) using matrix inversion method and Cramer's Rule.	15 L
			Dr. Aninda Chakrabarty	Basic Mathematics	Definition and scope of statistics, concepts of statistical population and sample. Data: qualitative and quantitative, discrete and	15 L

					continuous data types, primary and secondary data. Presentation of data: tabular and graphical. Frequency distribution, cumulative frequency distribution and their graphical representations: histogram, frequency polygon, frequency curve, and O-gives. Measures of Central Tendency: mean, weighted mean, median, mode. Measures of Dispersion: range, mean deviation, standard deviation, coefficient of variation, moments, skewness and kurtosis.	