Module for Mathematics (Honours)
Session: 2023 – 2024

Teacher's name: Dr. Sabina Eyasmin

1st Semester

Months	Paper	Topics	No. of classes
August 2023	MATH1011 MATH1021	Triple product of vector,introduction to vector functions, algebric operations on vector valued functions	9
September 2023	MATH1011 MATH1021	Limits and continuity of vector functions,differentiation and partial differentiation of vector functions	9
		Revision and Question answer session and class-test	3
October 2023	MATH1011 MATH1021	Gradient of a scaler function, divergent and curl of vector functions	5
		Revision and Question answer session and class-test	3
November 2023	MATH1011 MATH1021	Gradient of a scaler function, divergent and curl of vector functions	9
		Revision and Question answer session and class-test	3
December 2023	MATH1011 MATH1021	Revision and Question answer session and class-test	10

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Module for Mathematics (Honours)
Session: 2023 – 2024

Teacher's name: Dr. Sabina Eyasmin

2nd Semester

Months	Paper	Topics	No. of classes
February 2024	MATH2011 MATH2021	Partial order, total order relations,partitions of a set and its connection with equivalence relation, greatest lower bound, least upper bound,maximal, minimal elements.	4
March 2024	MATH2011 MATH2021	lattice, bounded lattice, modular lattice, distributive lattice, complemented lattice, statement of Zorn's lemma.	9
		Revision and Question answer session and class-test	3
April 2024	MATH2011 MATH2021	Semigroups, Monoids, Groups- examples including permutation group, Matrix groups $(M\_{(n \times n)}(R), GL\_n(R), SL\_n(R)), Z\_n$, elementary properties of groups, generators and relations, order of an element of a group	9
		Revision and Question answer session and class-test	3
May 2024	MATH2011 MATH2021	Subgroups and examples of subgroups, cosets, normal subgroup, center of a group, cyclic groups, Lagrange's theorem.	9
		Revision and Question answer session and class-test	3
June 2024	MATH2011 MATH2021	Rings, subrings, Ideals (left, right and two sided), integral domain, field, subfield.- examples and basic properties, characteristic of a ring and field.	9
		Revision and Question answer session of all units	3

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Module for Mathematics (Honours)
Session: 2023 – 2024

Teacher's name: Dr. Sabina Eyasmin

3rd Semester

Months	Paper	Unit	Topics	No. of classes
September 2023	BMH3CC05	1	Limits of functions (ϵ - δ approach), sequential criterion for limits, divergence criteria. Limit theorems, one sided limits. Infinite limits and limits at infinity.	4
October 2023	BMH3CC05	1	Continuous functions, sequential criterion for continuity and discontinuity. Algebra of continuous functions. Continuous functions on an interval. Intermediate value theorem, location of roots theorem, preservation of intervals theorem. Uniform continuity. non-uniform continuity criteria, theorems on uniform continuity.	10
			Revision and Question answer session	4
November 2023	BMH3CC05	2	Differentiability of a function at a point and in an interval, Caratheodory's theorem, algebra of differentiable functions. Relative extrema, interior extremum.Rolle's theorem. Mean value theorem, intermediate value property of derivatives, Darboux's theorem. Applications of mean value theorem to inequalities and approximation of polynomials, Application of differential calculus: Curvature.	14
			Revision and Question answer session and class test	4
December 2023	BMH3CC05	3	Cauchy's mean value theorem. Taylor's theorem with Lagrange's form of remainder. Taylor's theorem with Cauchy's form of remainder, application of Taylor's theorem to convex functions, relative extrema. Taylor's series and Maclaurin's series expansion of various functions about some real number.Taylor's series and Maclaurin's series expansions of exponential and trigonometric functions, ln (1+x), 1/(ax+b), (1+x)^n, sin x etc. and other functions. Application of Taylor's theorem to inequalities.	16
			Revision and Question answer session and class test	4
January 2024	BMH3CC05	4	A quick overview in real analysis. Review several properties of sets in R. Introduction to Metric space by several examples.	6
		4	Metric spaces: Definition and examples. Open and closed balls, neighbourhood, open set, interior of a set. Limit point of a set, closed set, diameter of a set, subspaces, dense sets, separable spaces.	10
			Revision and Question answer session and class test	4

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Teacher's name: Dr. Sabina Eyasmin

4th Semester

Months	Paper	Unit	Topics	No. of classes
February 2024	BMH4CC08	1	Riemann integration: inequalities of upper and lower sums, Darbaux integration, Darbaux theorem, Riemann conditions of integrability, Riemann sum and definition of Riemann integral through Riemann sums, equivalence of two Definitions.	14
			Revision and Question answer session.	4
March 2024	BMH4CC08	1	Riemann integrability of monotone and continuous functions, Properties of the Riemann integral; definition and integrability of piecewise continuous and monotone functions. Intermediate Value theorem for Integrals, Fundamental theorem of Integral Calculus.	16
			Revision and Question answer session and class-test	4
		2	Improper integrals. Convergence of Beta and Gamma functions.	4
April 2024	BMH4CC08	3	Pointwise and uniform convergence of sequence of functions. Theorems on continuity, derivability and integrability of the limit function of a sequence of functions. Series of functions, Theorems on the continuity and derivability of the sum function of a series of functions; Cauchy criterion for uniform convergence and Weierstrass M-Test.	12
			Revision and Question answer session and class-test	4
May 2024	BMH4CC08	4	Fourier series: Definition of Fourier coefficients and series, Riemann- Lebesgue lemma, Bessel's inequality, Parseval's identity, Dirichlet's condition. Examples of Fourier expansions and summation results for series.	16
			Revision and Question answer session and class-test	4
June 2024	BMH4CC08	5	Power series, radius of convergence, Cauchy Hadamard Theorem. Differentiation and integration of power series; Abel's Theorem; Weierstrass Approximation Theorem.	16
			Revision and Question answer session of all units	4

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Teacher's name: Dr. Sabina Eyasmin

5th Semester

Months	Paper	Unit	Topics	No. of classes
September 2023	BMH5DSE21	1	Sample space, probability axioms, real random variables (discrete and continuous), cumulative distribution function, probability mass/density functions, mathematical expectation, moments, moment generating function, characteristic function, discrete distributions: uniform, binomial, Poisson, geometric, negative binomial, continuous distributions: uniform, normal, exponential.	8
October 2023	BMH5DSE21	2	Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions, expectation of function of two random variables, conditional expectations, independent random variables, bivariate normal distribution.	8
			Revision and Question answer session.	4
November 2023	BMH5DSE21	2	Correlation coefficient, joint moment generating function (jmgf) and calculation of covariance (from jmgf), linear regression for two variables.	8
		3	Chebyshev's inequality, statement and interpretation of (weak) law of large numbers and strong law of large numbers.	8
			Revision and Question answer session and class test.	4
December 2023	BMH5DSE21	3	Central Limit theorem for independent and identically distributed random variables with finite variance, Markov Chains, Chapman-Kolmogorov equations, classification of states.	16
			Revision and Question answer session and class-test.	4
January 2024	BMH5DSE21	4	Random Samples, Sampling Distributions, Estimation of parameters, Null hypothesis, accept/reject null hypothesis based on critical value and significance level, Testing of hypothesis. Several problems of testing hypothesis.	16
			Revision and Question answer session and class-test.	4

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6th Semester

Months	Paper	Unit	Topics	No. of classes
February 2024	BMH6DSE42	1	Theory of Space Curves: Space curves. Planer curves. Curvature, torsion and Serret-Frenet formula. Osculating circles. Osculating circles and spheres. Existence of space curves. Evolutes and involutes of curves.	15
			Revision and Question answer session.	3
March 2024	BMH6DSE42	2	Theory of Surfaces: Parametric curves on surfaces. Direction coefficients. First and second Fundamental forms	16
			Revision and Question answer session and class-test	4
April 2024	BMH6DSE42	2	Principal and Gaussian curvatures. Lines of curvature. Euler's theorem. Rodrigue's formula. Conjugate and Asymptotic lines	15
			Revision and Question answer session and class-test	3
	Project		Instruction for Project work	2
May 2024	BMH6DSE42	3	Developables: Developable associated with space curves and curves on surfaces. Minimal surfaces. Geodesics: Canonical geodesic equations. Nature of geodesics on a surface of revolution.	14
			Revision and Question answer session and class-test	3
	Project		Instruction for completing Project work	3
June 2024	BMH6DSE42	3	Clairaut's theorem. Normal property of geodesics. Torsion of a geodesic. Geodesic curvature. Gauss-Bonnet theorem.	8
			Revision and Question answer session of all units and class-test	8

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Module for Computer Science
Session: 2023 – 2024

Teacher's name: Dr. Sabina Eyasmin

1st Semester

Months	Paper	Topics	No. of classes
August 2023	COMP1031	Introduction- Introduction to computers – Evolution Generation of Computers	4
September 2023	COMP1031	Computers Hierarchy -Applications of Computers. Windows Basics - Introduction to word .	4
October 2023	COMP1031	Editing a document - Move and Copy text - Formatting text & Paragraph	4
November 2023	COMP1031	Enhancing document - Columns, Tables and Other features.	4
December 2023	COMP1031	Revision and Question answer session and class-test	4

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Module

Mathematics (4year Hons) 1st Semester 2023-2024
Prof. Bhaskar Ghosh
Paper: Calculus, Geometry & Vector Calculus.

Month	No of Class	Topics
August	2+3	Hyperbolic functions, higher order derivatives
	1	higher order derivatives ,Tutorial
September	1+3	Leibnitz rule and its applications to problems of type $e^{ax+b}sinx, e^{ax+b}cosx, (ax+b)^n sinx, (ax+b)^n cosx$.
	2+3	. Inderminate Form and L'Hospital's Rule.
	1	Inderminate Form and L'Hospital's Rule ,Tutorial
October	2+1	Concavity and inflection points, Envelopes, Asymptotes.
	1	Envelopes & Asymptotes, Tutorial
November	3+1	Curve tracing in Cartesian coordinates, tracing in polar coordinates of standard curves.
	2+3	Reduction formulae, derivations and illustrations of reduction formulae for the integration of sinnx, cosnx, tannx, secnx, $(logx)^n$, $sin^n x sin^m x$,
	1	Reduction formulae ,Tutorial
December	2+2	Parametric equations, Parametrizing a curve, arc length, arc length of parametric curves, area of surface of revolution.
	2	Reduction formulae ,Tutorial

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Module

Mathematics (4year Hons) 2ⁿᵈ Semester 2023-2024
Prof. Bhaskar Ghosh

Paper: Programming in C.

Month	No of Class	Topics
February	2+3+2	Introduction, Basic structures, Character set, keywords, Identifiers. Constants. Variable type declaration, operators: Arithmetic, Relational. Logical, Assignment, Increment, Decrement, Conditional. Operator Precedence and associativity, arithmetic expression. Evaluation and type conversion. Character reading and writing. Formatted input and output statement.
	1+1	Programming in C ,Tutorial
March	2+3+2	Decision making (branching and looping): simple and nested if , if- also, switch, do-while, for statements. Concepts of array variables, string handling with arrays-reading and writing, string handling functions.
	2+1	Programming in C ,Tutorial
April	2+1+2	User defined functions, call-by value, call-by-reference functions and their user, return values and their types, nesting of functions,recursion.
	2	Programming in C ,Tutorial
May	3+1	Structures: Declaration, initialization, nested structures, arrays of structures, arrays within structures.
	2	Programming in C ,Tutorial
June	2+2	Pointers: Declaration, initialization, accessing vabiables through pointer, pointer arithmetic, pointers and arrays.
	2	Programming in C ,Tutorial

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Module

Mathematics (Hons.) 3rd Semester (2023-24)

Prof. Bhaskar Ghosh

Months	Paper	Unit	Topics	No. of classes
September	CC07	I	Algorithm, Convergence, Errors: Relative & Absolute, Round off. Interpolation: Lagrange and Newton's method Error bounds.	2+3
October	CC07	IV	Finite difference operators. Gregory forward and backward difference interpolations. Numerical differentiation: Methods based on interpolations methods based on finite differences.	1+1+2
		II	Regula- Falsi method, Fixed point iteration, Newton-Raphson method, Rate of convergence of these methods.,	2+1+2
November	CC07	II	Truncation, Transcendental and Polynomial equation, Bisection method, Newton's method, Secant method	3+4
		III	System of linear algebraic equations: Gaussian Elimination and Gauss Jordan methods. Gauss Jacobi method. Gauss Seidel method and their convergence analysis. LU Decomposition.	2+3+4
December	CC07	III & V	Ordinary Differential Equations: The method of successive approximations, Euler's method, the modified Euler method.	4+3+2
January	CC07		Runge- Kutt method of orders two and four. Revision and question answer session.	3+7

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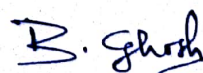Chandidas Mahavidyalaya
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Module

Mathematics (Hons.) 4th Semester (2023-24)

Prof. Bhaskar Ghosh

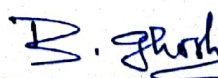| Months	Paper	Unit	Topics	No. of classes
March	CC10	I	Definition and examples of rings, properties of rings, subrings, integral domains and fields, characteristic of a ring. Ideal, ideal generated by a subset of a ring, factor rings,	10
April	CC10	II & III	Operations on ideals, prime and maximal ideals. Ring, homomorphisms, properties of ring homomorphism's. Isomorphism theorems I, II and III, field of quotients.	13
May	CC10	III & IV	Vector spaces, subspaces, algebra of subspaces, quotient spaces, linear combination of vectors, linear span. Linear independence, basis and dimension, dimension of subspaces, extension, deletion and replacement theorems.	14
June	CC10	IV	Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations. Isomorphisms, Isomorphism theorems, invertibility and isomorphisms, change of coordinate matrix. Revision and question answer session	12

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Mathematics (Hons) 5th Semester (2023-24)

Prof. Bhaskar Ghosh

Months	Paper	Unit	Topics	No. of classes
September	DSE11	I	Introduction to linear programming problem. Theory of simplex method, graphical solution, convex sets, optimality and unboundedness.	5
October	DSE11	I	The simplex algorithm, simplex method in tableau format, introduction to artificial variables, two-phase method. Big-M method and their comparison.	12
November	DSE11	II	Duality, formulation of the dual problem, primal-dual relationships, economic interpretation of the dual, Dual Simplex method.	10
December	DSE11	III	Transportation problem and its mathematical formulation, northwest-corner method, least cost method and Vogel approximation method for determination of starting basic solution.	6
			Algorithm for solving transportation problem, assignment problem and its mathematical formulation, Hungarian method for solving assignment problem, Travelling salesman problem.	10
January	DSE11	IV	Game theory: Formulation of two person zero sum games, solving two person zero sum games, games with mixed strategies, graphical solution procedure, linear programming solution of games.	12
February	DSE11		Revision and Question answer session	04

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Module

Mathematics (Hons) 6th Semester (2023-24)

Prof. Bhaskar Ghosh

Months	Paper	Unit	Topics	No. of classes
March	CC13	I	Sequences in Metric Spaces, Cauchy sequences. Complete Metric Spaces, Cantor's theorem..	12
April	CC13	I	Continuous mappings, sequential criterion and other characterizations of continuity, Uniform continuity, Connectedness, connected subsets of R.	12
May	CC13	II	Compactness: Sequential compactness, Heine-Borel property, Totally bounded spaces, finite intersection property, 27 and continuous functions on compact sets.	14
June	CC13	II & All un its	Homeomorphism, Contraction mappings, Banach Fixed point Theorem and its application to ordinary differential equation.	12
JUly	CC13		Revision and Question answer session	02

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Mathematics (Hons) 1ˢᵗ Semester (2023-24)

Bipattaran Raj

Months	Paper	Topics	No. of classes
August	MATH 1011	Reflection properties of conics, translation and rotation of axes and second- degree equations,	08
September	MATH 1011	. Classification of conics using the discriminant, polar equations of conics. Spheres, Cylindrical surfaces.	09
October	MATH 1011	Central conicoids, Paraboloids, plane sections of conicoids.	05
November	MATH 1011	Generating lines, Classification of quadrics,	06
December	MATH 1011	Revision and Question answer session	09

2ⁿᵈ Semester(2023-24)

Months	Paper	Topics	No. of classes
February	MATH 2011	Theory of equations: Relation between roots and coefficients, Transformation of equation, Descartes rule of signs,.	07
March	MATH 2011	Cubic and bi-quadratic equations. Reciprocal equation, separation of the roots of equations, Strum,s theorem	08
April	MATH 2011	Inequality: The inequality involving $AM \geq GM \geq HM$, Cauchy-Schwartz inequality	08
May	MATH 2011	Revision and Question answer session	09

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Module

Mathematics (Hons.) 3rd Semester (2023-24)

Bipattaran Raj

Months	Paper	Unit	Topics	No. of classes
September	SEC11	I	Introduction, propositions, truth table, negation, conjunction and disjunction. Implications, bi-conditional propositions, converse, contra positive and inverse propositions.	6
October	SEC11	I	precedence of logical operators. Propositional equivalence: Logical equivalences. Predicates and quantifiers: Introduction, Quantifiers, Binding variables and negations.	10
November	SEC11	II	Sets, subsets, Set operations and the laws of set theory and Venn diagrams. Examples of finite and infinite sets. Finite sets and counting principle. Empty set, properties of empty set. Standard set operations. Classes of sets. Power set of a set	11
December	SEC11	II	Difference and Symmetric difference of two sets. Set identities, Generalized union and intersections.	15
January	SEC11	III	Relation: Product set. Composition of relations, Types of relations, Partitions, Equivalence Relations with example of congruence modulo relation. Partial ordering relations, n-ary relations	14

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Mathematics (Hons) 4th Semester (2023-24)

Months	Paper	Unit	Topics	No. of classes
March	CC09	I	Functions of several variables, limit and continuity of functions of n variables, Partial differentiation, total differentiability and differentiability, sufficient condition for differentiability. Chain rule for one and two independent parameters, directional derivatives, the gradient, Jacobian.	11
April	CC09	I &II	Maximal and normal property of gradient, tangent planes, Extrema of function of n variables with necessary and sufficient conditions, method of Lagrange multipliers.Double integration over rectangular region, double integration over non-rectangular region, Double integrals in polar co-ordinates.	12
May	CC09	II &III	Triple integrals, Triple integral over a parallelepiped and solid regions. Volume by triple integrals, cylindrical and spherical co-ordinates. Change of variables in double integrals and triple integrals. vector operators, Gradient of a scalar function, directional derivatives, Definition of vector field. divergence and curl.	10
June	CC09	III	Line integrals, Fundamental theorem for line integrals, conservative vector fields, Application of line integral to Work done.Green's theorem, surface integrals, integrals over parametrically defined surfaces. Stoke's theorem, The Divergence theorem.	12

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Module

Mathematics (Hons) 5th Semester (2023-24)

Bipattaran Raj

Months	Paper	Unit	Topic	No. of classes
September	CC12	I	Co-planer forces, Astatic equilibrium, Friction, Equilibrium of a particle on a rough curve. Virtual work.	05
October	CC12	I	Forces in 3- dimensions, General condition of equilibrium, Centre of gravity for different bodies. Stable and Unstable equilibrium, Equilibrium of flexible string. Simple Harmonic Motion, Damped and forced vibrations. Components of velocity and acceleration, Equations of motion referred to a set of rotating axis. Motion of projectile in a resisting medium.	15
November	CC12	II	Motion of a particle under central force. Kepler's laws of motion, motion under the inverse square law, Stability of nearly circular orbits, Slightly disturbed orbits, Motion of Artificial satellite.	15
December	CC12	II	Varying mass, constraint, Motion of a particle in 3- dimensions, Motion on a smooth sphere, cone and on any surface revolutions, Degrees of freedom, Moment and Product of Inertia, Momentum ellipsoid, Principal axes.	20
January	CC12	II	D'Alembert's Principal, Motion about a fixed axes, Compound pendulum, Motion of a system of particles, Motion of a rigid body in 2-dimensions, under finite and impulsive forces, conservation of momentum and energy	18

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Mathematics (Hons) 6th Semester (2023-24)

Bipattaran Raj

Months	Paper	Unit	Topic	No. of classes
March	CC14	II	Dual spaces, dual basis, double dual, transpose of a linear transformation and its matrix in the dual basis, Annihilators.	12
April	CC14	II	Eigen spaces of a linear operator, Diagonalizability, Invariant subspaces and Cayley- Hamilton theorem. The minimal polynomial for a linear operator, Canonical form.	13
May	CC14	III	Inner Product spaces and norms Gram-Schmidt orthogonalization process, Orthogonal complement, Bessel's inequality. the adjoint of a linear operator, Leastsquare approximations, minimal solutions to system of linear equations.	14
June	CC14	III	Normal and Self adjoin operators, Orthogonal projections and spectral theorem. Revision and Question Answer session.	11

Module

Mathematics (Hons.) 1st Semester (2023-24).

Prof. Arghya Ghosh.

Months	Paper	Topics	No. of classes
August	SEC	Definition, examples and basic properties of graphs, Pseudo graphs, complete graphs, bi-partite graphs.	5
September	SEC	Isomorphism of graphs, Eulerian graph, semi-Eulerian graph and theorems, Hamiltonian cycles and theorems. Representation of a graph by a matrix.	9
October	SEC	The adjacency matrix, incidence matrix, weighted graph. Travelling salesman's problem, shortest path,	9
November	SEC	Dijkstra's algorithm, Warshall algorithm. Tree and their properties, spanning tree.	9
December	SEC	Revision and Question answer session.	4

Mathematics (Hons.) 2nd Semester (2023-24)

Prof. Arghya Ghosh.

Months	Paper	Topics	No. of classes
February	MATH2011	Well-ordering property of positive integers, Division algorithm.	6
March	MATH2011	Divisibility and Euclidean algorithm. Greatest common divisor. Least common multiple, Linear Diophantine equation. Prime Numbers, Relatively Prime Numbers and related Properties including Euclid's lemma.	11
April	MATH2011	Fundamental Theorem of Arithmetic and its applications, Perfect square and square free integers. Congruence, Solution of congruence, Binary and decimal representation of integer.	10
May	MATH2011	Chinese remainder theorem and its application. Fermat's little theorem. Wilson's theorem, sum of two squares, Arithmetic function-	9

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Module

Mathematics (Hons.) 3rd Semester (2023-24)

Prof. Arghya Ghosh

Months	Paper	Unit	Topics	No. of classes
September	CC06	I	Symmetries of square, Dihedral groups.	4
October	CC06	I&II	Examples of groups including permutation groups and quaternion groups, elementary properties of groups, Subgroups and examples of Subgroups, centralizer, normalize, centre of a group, product of two subgroups.	12
November	CC06	III	Properties of cyclic groups, classification of subgroups of cyclic groups, cycle notation for permutations, properties of permutations, even and permutations, alternating groups.	12
December	CC06	III	Properties of cosets, Lagrange's theorem and consequences including Fermat's Little theorem. External direct product of a finite number of groups, normal groups, factor groups, Cauchy's theorem for finite abelian groups.	11
January	CC06	IV & V	Group homomorphism, properties of homomorphism. Cayley's theorem, properties of isomorphism, First isomorphism theorem. Second and Third isomorphism. Revision and question answer session.	12

Mathematics (Hons.) 4th Semester (2023-24)

Prof. Arghya Ghosh

Months	Paper	Unit	Topics	No. of classes
March	SEC21	I	Definition, examples and basic properties of graphs, Pseudo graphs, complete graphs, bi-partite graphs.	8
April	SEC21	I & II	Isomorphism of graphs, Eulerian graph, semi-Eulerian graph and theorems, Hamiltonian cycles and theorems. Representation of a graph by a matrix.	13
May	SEC21	II & III	The adjacency matrix, incidence matrix, weighted graph. Travelling salesman's problem, shortest path, tree and their properties, spanning tree.	12
June	SEC21	III &All units	Dijkstra's algorithm, Warshall algorithm.Revision and question answer session.	13

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Module

Mathematics (Hons.) 5th Semester (2023-24)

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Months	Paper	Unit	Topics	No. of classes
September	CC11	I	Partial Differential Equations-Basic concepts and definitions. Mathematical problems. First order Equations: Classification, construction and Geometrical Interpretation.	12
October	CC11	I	Method of characteristics for obtaining General solution of Quasi-linear Equations. Canonical form of First-order linear Equations. Method of Separation of Variable for solving first order partial Differential Equations.	8
November	CC11	I & II	Derivation of Heat, Wave and Laplace equation. Classification of second order linear equations as hyperbolic, parabolic. Classification of second order linear equation as elliptic. Reduction of second order Linear Equations to Canonical forms.	13
December	CC11	III	The Cauchy problem of second order partial differential equation, Cauchy-Kowalewskaya theorem, Cauchy problem of an infinite string, Initial and Boundary value problems. Semi –infinite string with a fixed end, Semi-infinite string with a free end.	12
January	CC11	III	Equations with non-homogeneous boundary conditions. Non-homogeneous Wave Equation. Method of Separable of variables: Solving the Vibrating string problem. Solving the Heat conduction problem. Graphical Demonstration & Revision and Question answer session	13

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Module

Mathematics (Hons.) 6th Semester (2023-24)

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Months	Paper	Unit	Topics	No. of classes
March	CC13	III & IV	Limits, Limits involving the point at infinity, continuity, properties of complex numbers, regions in the complex plane, functions of complex variable, mappings. Derivatives, differentiation formulas, Cauchy-Riemann equations, sufficient conditions for differentiability. Analytic functions, Examples of analytic functions, exponential function, Logarithmic function, trigonometric function.	12
April	CC13	IV & V	Derivatives of functions and definite integrals of functions ,contours, contour integrals and its examples, upper bounds for moduli of contour integrals, Cauchy-Goursat theorem, Cauchy integral formula. Liouville's theorem and the fundamental theorem of algebra.	13
May	CC13&CC14	V , VI &I	Convergence of sequences and series. Taylor series and its examples. Laurent Series and its examples. Absolute and uniform convergence of power series. Polynomial rings over commutative rings, division algorithm and consequences, Principal ideal domain.	13
June	CC14	I &All units	Factorization of polynomials, reducibility and irreducibility tests, Eisenstein criterion and unique factorization in $Z[x]$. Divisibility in integral domains, irreducible, primes, unique factorization domains, Euclidean domain & Revision and Question answer session	13

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