Department of Mathematics
Sarojini Naidu College for Women

Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMACOR01T

Course Title: CALCULUS, GEOMETRY AND ORDINARY DIFFERENTIAL EQUATION

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Recall the foundational knowledge of Calculus, Geometry and Differential Equation (Level 1)
CO-2:	Distinguish Ordinary Differential Equations (Level 2)
CO-3:	Experiment to Solve Problems of Calculus and Geometry (Level 4)
CO-4:	Combine to Draw the Sketch of Parametric Curves, Trace Conics etc and can Apply the Knowledge for Problem Solving and Modelling (Level 6)

Course Code: MTMACOR02T

Course Title: ALGEBRA

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Outline the Basic Ideas of Classical Algebra (Level 1)
CO-2:	Compute the Problems of Complex Number, Theory of Equation, Inequality (Level 3)
CO-3:	Asses the Concept of Linear Algebra (Level 5)
CO-4:	Comply the Rank of a Matrix, Can Solve System of Linear Equations, Eigen Values problems etc (Level 6)

Department of Mathematics
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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMACOR03T

Course Title: REAL ANALYSIS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Recall and Identify the ideas of Real Numbers, Countable and Uncountable Properties of Sets (Level 1)
CO-2:	Distinguish the Concepts of Bounded and Unbounded Sets, Limit Points, Interior Points (Level 4)
CO-3:	Summarize the Knowledge of Real Sequence, Subsequence in detail (Level 5)
CO-4:	Develop the the Concept of Series and its Convergence (Level 6)

Course Code: MTMACOR04T

Course Title: DIFFERENTIAL EQUATION & VECTOR CALCULUS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Recall Different Methods of Ordinary Differential Equations, Identify Lipschitz Condition (Level 1)
CO-2:	Solve System of Linear Differential Equations (Level 3)
CO-3:	Describe Equilibrium Points, Evaluate Power Series Solution (Level 5)
CO-4:	Formulate Vector Products and Calculus of Vectors. (Level 6)

Department of Mathematics
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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMACOR05T

Course Title: THEORY OF REAL FUNCTIONS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Recognise Fundamental Knowledge of Limit, Continuity (Level 2)
CO-2:	Demonstrate Limit, Continuity and Corresponding Theorems (Level 3)
CO-3:	Identify Uniform Continuity (Level 4)
CO-4:	Explain Concept of Differentiability of a Real Function and Related Theorems and Problems (Level 5)
CO-5	Categorize Various Series Expansions (Level 6)

Course Code: MTMACOR06T

Course Title: GROUP THEORY-I

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Group, its properties and examples (Level 1)
CO-2:	Distinguish Subgroup, its properties and examples (Level 2)
CO-3:	Outline Cyclic Group, Permutation, Quotient Group (Level 4)
CO-4:	Explain Normal Subgroups, Direct Products (Level 5)
CO-5	Develop Homomorphisms, Isomorphisms (Level 6)

Department of Mathematics
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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMACOR07T

Course Title: NUMERICAL METHODS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Describe the Concept of Operators (Level 2)
CO-2:	Demonstrate Errors and Convergence of Numerical Method of Interpolation (Level 3)
CO-3:	Model Solution of Transcendental Equation and System of Linear Equation (Level 4)
CO-4:	Evaluate Numerical Differentiation, Integration and the Solution of Differential Equation (Level 5)

Course Code: MTMACOR07P

Course Title: NUMERICAL METHODS LAB

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Outline a Program in C Language (Level 1)
CO-2:	Solve Transcendental and Algebraic Equations Using C Language (Level 3)
CO-3:	Illustrate System of Linear Equations Using Various Methods Using C Language (Level 4)
CO-4:	Evaluate Numerical ODE, Integration Using C Language (Level 5)
CO-5	Formulate Polynomial Curve Fitting Using C Language (Level 6)

Department of Mathematics
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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMACOR08T

Course Title: RIEMANN INTEGRATION & SERIES OF FUNCTIONS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Riemann Integration and Outline its Properties (Level 1)
CO-2:	Compute Improper Integrals and Their Application in Convergence of Beta and Gamma Functions (Level 2)
CO-3:	Examine Pointwise and Uniform Convergence of a Sequence and Series of Functions (Level 4)
CO-4:	Develop Fourier Series and Riemann Lebesgue Lemma, Bessel's Inequality, Parseval Identity (Level 6)

Course Code: MTMACOR09T

Course Title: MULTIVARIATE CALCULUS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Recognize Function Containing more than One Variable (Level 1)
CO-2:	Discuss the Continuity, Differentiability, Maximum & Minimum Values of Multivariable Functions (Level 2)
CO-3:	Demonstrate Multiple Integrals and Interpret Vector Field, Divergence, Curl (Level 3)
CO-4:	Formulate Green's Theorem, Stoke's Theorem and Divergence Theorem (Level 6)

Department of Mathematics
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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMACOR10T

Course Title: RING THEORY AND LINEAR ALGEBRA-I

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Ring, Subring, Integral Domain, Field, Ideals,Vector Spaces, Subspaces, Basis and Dimension and Outline their properties (Level 1)
CO-2:	Analyze Ring Homomorphism and Illustrate Ring Isomorphism Theorems (Level 4)
CO-3:	Evaluate Dimension of Subspace, Null Space, Range and Matrix Representation of a Linear Transformation (Level 5)
CO-4:	Explain Isomorphisms and Develop Isomorphism Theorems for vector Spaces (Level 6)

Course Code: MTMACOR11T

Course Title: PARTIAL DIFFERENTIAL EQUATIONS , APPLICATION OF ORDINARY DIFFERENTIAL EQUATIONS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Recognize Partial Differential Equation (Level 1)
CO-2:	Solve PDE Using Different Methods (Level 3)
CO-3:	Examine Heat, Laplace and Wave Equation (Level 4)
CO-4:	Construct the Idea of Central Force, Constrained Motion, Planetary Motion and Varying Mass (Level 5)

Department of Mathematics
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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMACOR12T

Course Title: GROUP THEORY-II

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Automorphism and Automorphism Groups (Level 1)
CO-2:	Identify the Properties of External and Internal Direct Product (Level 2)
CO-3:	Apply Fundamental Theorem of Finite Abelian Groups (Level 3)
CO-4:	Summarize Application of Group action including Generalized Cayley's Theorem and Index Theorem (Level 5)
CO-5:	Develop Sylow's Theorems and Devise tests for simplicity of a group (Level 6)

Course Code: MTMACOR13T

Course Title: METRIC SPACE & COMPLEX ANALYSIS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Metric Spaces, Subspaces, Open Set, Closed Set, (Level 1)
CO-2:	Illustrate Complete, Connected and Compact Metric Spaces and Their properties (Level 3)
CO-3:	Evaluate Stereographic Projections, Differentiability, Power Series, Contour Integral (Level 5)
CO-4:	Develop Contraction Mapping and Banach Fixed Point Theorem to ODE, Complex Integration, Liouville's Theorem (Level 6)

Department of Mathematics
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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMACOR14T

Course Title: RING THEORY AND LINEAR ALGEBRA-II

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Integral Domain, Irreducible, Primes, Principal Ideal Domain, Unique Factorization Domain and Euclidean Domain (Level 1)
CO-2:	Explain Dual Space, EigenSpace, Diagonalizability, Cayley Hamilton Theorem, Minimal Polynomial of a Linear Operator and Canonical form (Level 2)
CO-3:	Apply Various Tests for Irreducibility of a Polynomial over a Given Field (Level 3)
CO-4:	Develop Operator Theory and Spectral Theory (Level 6)

Course Code: MTMADSE01T

Course Title: LINEAR PROGRAMMING

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Linear Programming Problem (Level 1)
CO-2:	Solve Linear Programming Problem by Simplex Method, Graphical Method, Big M Method, Duality (Level 3)
CO-3:	Calculate the Basic Solutions of Transportation Problem and Assignment Problem (Level 4)
CO-4:	Develop the Knowledge for Solving Game Theoretic Problems (Level 6)

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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMADSE02T

Course Title: NUMBER THEORY

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Outline the Preliminary Concepts of Number Theory (Level 1)
CO-2:	Review the Knowledge of Chinese Remainder Theorem, Fermat's Little Theorem and Willson's Theorem (Level 2)
CO-3:	Experiment the Knowledge of Various Number Theoretic Functions (Level 4)
CO-4:	Design Public Key Encryption like RSA. (Level 6)

Course Code: MTMADSE03T

Course Title: PROBABILITY AND STATISTICS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Outline Sample Space, Probability axioms, Cumulative Distribution Function, Mathematical Expectation, Moments, Moment Generating Function, Characteristic Function, Discrete Distributions, Continuous Distributions (Level 1)
CO-2:	Describe Joint Probability Density Functions, Marginal and Conditional Distributions, Expectation of Function, Conditional Expectations, Bivariate Normal Distribution, Correlation Coefficient, Joint Moment Generating Function (Level 2)
CO-3:	Interpret Chebyshev's Inequality, Weak Law of Large Numbers and Strong Law of Large Numbers, Central Limit Theorem, Markov Chains, Chapman-Kolmogorov Equations, Classification of States (Level 5)
CO-4:	Develop the Knowledge in Random Samples, Sampling Distributions, Estimation of Parameters, Testing of Hypothesis (Level 6)

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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMADSE04T

Course Title: THEORY OF EQUATIONS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Outline the Properties of Polynomials, Graphical Representation of a Polynomial, Maximum and Minimum Values of a Polynomials, General Properties of Equations, Descarte's Rule of Signs, Sturm's Theorem (Level 1)
CO-2:	Apply Descarte's Rule of Signs and Sturm's Theorem Cardan's and Ferrari's method. (Level 3)
CO-3:	Analyze Relation Between the Roots and the Coefficients of Equations. (Level 4)
CO-4:	Develop the Knowledge about Symmetric Functions of the Roots, Newton's Theorem on the Sums of Powers of Roots, Homogeneous Products, Limits of the Roots of Equations. (Level 6)

Course Code: MTMADSE05T

Course Title: BOOLEAN ALGEBRA AND AUTOMATA THEORY

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Ordered Sets, Modular and Distributive Lattices, Boolean Algebras, Boolean Polynomials (Level 1)
CO-2:	Describe Alphabets, Strings and Languages, Finite Automata and Regular Languages (Level 2)
CO-3:	Analyze Minimal and Maximal forms of Boolean Polynomials, Quinn-McCluskey Method, Karnaugh Diagrams, Logic Gates, Switching Circuits, Regular Languages, Pumping Lemma and Closure Properties of Regular Languages (Level 4)
CO-4:	Develop Knowledge in Context Free Grammars and Pushdown Automata, Turing Machines, Undecidability (Level 6)

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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMADSE06T

Course Title: MECHANICS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Outline Co-planar Forces, Astatic Equilibrium, Friction, Virtual Work, Stable and Unstable Equilibrium (Level 1)
CO-2:	Discuss Equilibrium of a Particle, Forces in Three Dimensions, General Conditions of Equilibrium, Centre of Gravity for Different Bodies (Level 2)
CO-3:	Analyze Equations of Motion, Motion of a Projectile, Motion Under the Inverse Square Law, Motion of Artificial Satellites, Motion on a Smooth Sphere, Cone (Level 4)
CO-4:	Explain Degrees of Freedom, Moments and Products of Inertia, Momental Ellipsoid, D'Alembert's Principle, Motion About a Fixed Axis, Compound Pendulum, Motion of a Rigid Body, Conservation of Momentum and Energy (Level 5)

Course Code: MTMSSEC01M

Course Title: C PROGRAMMING LANGUAGE

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Identify Machine Language, High-level Programming Languages and Outline Compilation Process, Algorithm and Flowchart (Level 1)
CO-2:	Recognize Data types, Constants, Variables, printf(), scanf() function and give Example of Various Operators in C Language (Level 2)
CO-3:	Demonstrate Conditional Statements and Loops in C Language (Level 3)
CO-4:	Model Single and Multi Dimensional Arrays and Outline Program in C Language for Simple Search and Sorting and Matrix Operations (Level 4)
CO-5:	Describe Pointers and Interpret Memory Allocation and Deallocation (Level 5)
CO-6:	Compose Functions and Formulate C Program for Swapping Values, n!, nCr, Find max/min from a List of Elements, Sort a Set of Numbers, Matrix Addition/Multiplication Using Function (Level 6)

Department of Mathematics
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Name of the Academic Program: B. Sc.(Hons) in Mathematics

Course Code: MTMSSEC02M

Course Title: LOGIC AND SETS

Course Outcome (COs)

After completion of this course successfully, the students will be able to

CO-1:	Define Sets, Subsets, Set Operations and Outline Laws of Set Theory and Venn Diagrams (Level 1)
CO-2:	Give Examples of Finite and Infinite Sets and Describe Counting Principle (Level 2)
CO-3:	Compute Union, Intersection, Difference and Symmetric Difference of Two Sets and Illustrate Set Identities (Level 3)
CO-4:	Categorize Relations on a Set and Examine Equivalence Relation(Level 4)
CO-5:	Interpret Truth Table, Negation, Conjunction, Disjunction, Implications, Biconditional Propositions, Converse, Contra Positive and Inverse Propositions and Precedence of Logical Operators. (Level 5)
CO-6:	Explain Logical Equivalences, Quantifiers, Binding Variables and Negations. (Level 5)