RISHI BANKIM CHANDRA COLLEGE FOR WOMEN

Program Outcomes
Department of MATHEMATICS

Sl No.	PO Master Name
1	Ability to use mathematics as a precise language of communication in other branches of human knowledge.
2	Ability to analyse the results and apply them in various problems appearing in different branches of mathematics.
3	Capability for inquiring about appropriate questions relating to the concepts in various fields of mathematics.
4	Demonstrate mathematical and statistical knowledge.
5	Obtain or create employment opportunities using her skills and mathematical knowledge.

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Course Outcomes

Department of MATHEMATICS

Sl No.	Semester	Course Name	Course Outcome
1	1st Semester	Calculus, geometry & ordinary differential equations course code - mtmacor01t	1. to develop a clear understanding of hyperbolic functions, including their definitions, properties, and relationships to exponential and trigonometric functions.
2	1st Semester	Algebra course code - mtmacor02t	1. to develop a clear understanding of the polar representation of complex numbers and its significance in representing complex numbers in a geometric form. 2. to develop a clear understanding of the cauchy-schwarz inequality and its significance in mathematics, particularly in linear algebra and analysis. 3. to develop a clear understanding of the principle of mathematical induction and its importance in mathematical reasoning and proof.
3	2nd Semester	Real analysis course code - mtmacor03t	1. to develop the conception of the limit point of a set. 2. to compare the cardinalities of different sets, including countable and uncountable sets, and understand the concepts of countable infinity and uncountable infinity. 3. to learn about different types of sequence and convergence of sequence. 4. to develop a clear understanding of infinite series and to determine its convergence by using various tests.
4	2nd Semester	Ordinary differential equation and vector calculus course code - mtmacor04t	1. to develop a clear understanding of the lipschitz condition and its significance
5	3rd Semester	Theory of real functions course code - mtmacor05t	1. to develop a clear understanding of the concept of limits of functions, including one-sided limits and limits at infinity. 2. to learn about properties of limits, such as the limit laws, continuity, and basic properties of arithmetic operations with limits. 3. to develop a clear understanding of the concept of differentiability for real-valued functions of one or more variables
6	3rd Semester	Group theory i course code - mtmacor06t	1. to develop a clear understanding of the concept of groups, including the definition, basic properties, and examples of groups. 2. to understand the concept of subgroups and be able to identify and analyze subgroups of given groups. 3. to learn about cyclic groups, generators, and cyclic subgroups, as well as their properties and applications.
7	3rd Semester	Numerical methods course code - mtmacor07t	1. to develop a clear understanding of numerical methods and their importance in solving mathematical problems that cannot be solved analytically. 2. to understand the concepts of approximation and error analysis in numerical methods, including understanding sources of error and methods for quantifying and controlling error. 3. to apply various root-finding methods, such as bisection method, newton-raphson method, and secant method, to find roots of equations.
8	3rd Semester	Numerical methods lab course code - mtmacor07p	1. to develop a clear understanding of numerical methods used for solving mathematical problems, including approximation, interpolation, numerical integration, solving differential equations, and root-finding algorithms. 2. to become proficient in programming using the c language, including understanding data types, control structures, functions, arrays, pointers, and memory management. 3. to

Sl No.	Semester	Course Name	Course Outcome
			implement various numerical algorithms using c programming 4. to understand the concept of numerical accuracy and error analysis
9	4th Semester	Riemann integration and series of functions course code - mtmacor08t	1. to learn about various properties of riemann integrals, including linearity, additivity, and the fundamental theorem of calculus. 2. to understand the conditions for a function to be riemann integrable and be able to determine the riemann integrability of simple functions. 3. to understand the concept of convergence for sequences and series of functions, including pointwise convergence, uniform convergence, and absolute convergence. 4. to learn about various tests for convergence of series, including the comparison test, the ratio test, the root test, and the integral test.
10	4th Semester	Multivariate calculus course code - mtmacor09t	1. to develop a clear understanding of functions of several variables, including concepts such as domain, range, continuity, and differentiability. 2. to be proficient in finding partial derivatives of multivariable functions and understand their geometric interpretation. 3. to learn about vector calculus operators such as gradient, divergence, and curl, and understand their geometric and physical interpretations.
11	4th Semester	Ring theory and linear algebra i course code - mtmacor010t	1. to develop a clear understanding of the definition and basic properties of rings 2. to develop the concept of integral domain, field, subrings, ideals 3. to learn about various properties of vector spaces and its basis 4. to understand linear transformations between vector spaces and their properties
12	5th Semester	Partial differential equations, applications of ordinary differential equations course code - mtmacor011t	1. to be able to classify different types of partial differential equations (e.g., elliptic, parabolic, hyperbolic) based on their characteristics and properties. 2. to be familiar with various analytical and numerical methods for solving pdes, including separation of variables, fourier series, laplace transforms, finite difference methods, finite element methods, and others. 3. to be able to analyze and interpret solutions to pdes, including understanding the behavior of solutions under different boundary and initial conditions, as well as asymptotic behavior. 4. to be able to apply the concepts and techniques learned to solve practical problems in various scientific and engineering disciplines.
13	5th Semester	Group theory ii course code - mtmacor012t	1. to be able to define automorphisms of a group and demonstrate proficiency in proving basic properties of automorphisms, such as composition, inverse, and the preservation of group structure. 2. to gain a deep knowledge about external and internal direct product of groups and also finite abelian groups 3. to develop a solid understanding of group actions and class equations 4. to explore the syllow’s theorems and simple groups
14	5th Semester	Linear programming course code - mtmadse01t	1. to be proficient in solving lp problems using various methods such as graphical methods, the simplex method, and software-based approaches. 2. to learn how to translate real-world problems into mathematical models using lp techniques. 3. to cover optimization techniques applicable to lp, duality theory 4. to gain hands-on experience with software tools commonly used for lp modeling and solution 5. to explore game theory
15	5th Semester	Number theory course code - mtmadse02t	1. knowledge of fundamental properties of integers and prime numbers 2. ability to solve basic diophantine equations, including linear and quadratic equations, and understanding of techniques such as modular arithmetic and the euclidean algorithm for solving more complex cases. 3. understanding of arithmetic functions such as euler phi function, farmet’s theorem, euler’s theorem 4. to develop a deep knowledge on primitive roots 5. awareness of cryptographic

Sl No.	Semester	Course Name	Course Outcome
			applications of number theory, including basic understanding of rsa encryption and decryption algorithms.
16	6th Semester	Metric spaces and complex analysis course code - mtmacor13t	1. to work with various types of convergence in metric spaces, including pointwise convergence, uniform convergence, and convergence in measure. 2. understanding of completeness in metric spaces and its implications, including the concept of cauchy sequences and the completeness of important metric spaces like euclidean spaces. 3. to learn about analytic functions, including the concept of holomorphy, cauchy- riemann equations, and the relationship between analyticity and differentiability. 4. ability to represent complex functions as taylor series and laurent series expansions, and understanding their convergence properties.
17	6th Semester	Ring theory and linear algebra ii course code - mtmacor14t	1. to understand the definition and properties of polynomial rings, including concepts such as addition, multiplication, and degree of polynomials. 2. to be able to identify polynomial rings as specific types of rings, such as commutative rings with identity. 3. to be able to describe the properties of dual spaces, including its vector space structure and the relationship between a vector space and its dual space. 4. to be able to define and understand inner product spaces, including the properties of inner products such as linearity in the first argument, conjugate symmetry, and positive definiteness. 5. to understand the concept of norms on vector spaces and be able to define and compute norms in various contexts.
18	6th Semester	Theory of equations course code - mtmadse04t	1. to gain a comprehensive c understanding of polynomial equations, including their properties, roots, and solutions. 2. mastery of various techniques for solving polynomial equations, such as factoring, synthetic division, long division, and the quadratic formula. 3. ability to find roots and zeros of polynomial equations, including complex roots, and understanding their significance in graphical representation.
19	6th Semester	Mechanics course code - mtmadse06t	To develop the ability to apply theoretical principles to solve a variety of problems related to motion, forces, and energy. 4. to understand the concept of force and be able to analyze various types of forces acting on objects, including gravitational, frictional, and normal forces. 5. to understand the concepts of work and energy and be able to apply the workenergy theorem to solve problems related to kinetic and potential energy. 6. to understand the concepts of momentum and impulse and be able to apply them to analyze collisions and other dynamic situations.