DEPARTMENT OF MATHEMATICS

Program Specific Outcome

- Students will understand the basic rules of logic, including the role of axioms or assumptions.

- Understand the appreciate the role of mathematical proof in formal deductive reasoning.

- Students will be able to distinguish a coherent argument from a fallacious one, both in mathematical reasoning and in everyday life.

- Understand and be able to articulate the differences between inductive and deductive reasoning.

- Students will be able to formulate and solve abstract mathematical problems

- Students will recognize real-world problems that are amenable to mathematical analysis, and formulate mathematical models of such problems

- Students will recognize connections between different branches of mathematics

- Students will recognize and appreciate the connections between theory and applications.

- Students will be able to present mathematics clearly and precisely to an audience of peers and faculty

Course outcome of Mathematics Department

Class	Course	Outcome
F.Y.B.Sc.	MTH-121: Ordinary Differential Equations.	1. identify& solve different types of first order ,first degree differential equation
		2. identify& solve first order & higher degree differential equations
		3. identify& solve linear differential equations of second & third order.
		4. identify& solve homogeneous linear differential equation.
	MTH-122: Theory of Numbers and Equations	1. to use principle of mathematical induction,find GCD using division algorithm.
		2. identify equivalence relation, find equivalence classes, residue classes &use their properties
		3. describe relation between roots & coefficients of quadratic, cubic & biquadratic equations.
		4. solve cubic equation using Cardin's method, Solve biquadratic equations using Descart's method.
	MTH – 123 (A) : Laplace transforms	1. use Laplace Transform & it's properties
		2. use inverse Laplace Transform& it's properties.
		3. convolution theorem
		4. solve Linear differential equation with constant coefficient using Laplace Transform.
	MTH – 123 (B): Numerical Methods	1.solve algebraic & transcendental equations using Bisection, Newton-Rapson, Iteration &Regulafalsi methods.
		2. interpolate values of unknown function using Gauss forward & backward central difference formulae, Lagrange's formula.
		3. to fit linear, quadratic & exponential least square best curves to given data.
		4. solve first order differential equation with initial condition using Eulers, Modified eulers, Taylors, &RungeKutta Methods
S.Y. B.Sc.	MTH -231: Calculus of Several Variables	1. discuss continuity of a function oftwo variables, find partial derivatives
		2. expand function of two variables in Taylor series

		3. discuss extreme values of the function of two & three variables.
		4. evaluate double & triple integrals.
	MTH -232(A): Algebra & MTH -232(B): Theory of Groups	1. discuss the algebraic structure group & it's properties.
		2. discuss subgroups, cyclic group & cosets
		3. identify whether two groups are isomorphic or not.
		4. discuss the algebraic structure ring, fild& their properties
		5. discuss encoding, decoding functions, group code, detection of errors & correction of errors using parity check matrix.
	MTH -241 : Complex Variables	1. useDeMoiver's theorem to find roots of a complex numbers.
		2. discuss continuity & derivability of function of complex variables, construct analytic function using Milne Thomson method.
		3. evaluate integrals of a function of complex variables along different paths.
		4. evaluate integrals using Cauchy's integral formula, calculate residues at different poles of a function of complex variables.
		5. apply Cauchy's residue theorem to evaluate integral.
	MTH-242(A): Differential Equations& MTH-242(B): Differential and Difference Equations	1. identify linearly independent & linearly dependent solution of a differential equation.
		2. solve second order differential equation using variation of parameter method.
		3. solve simultaneous differential equation using different methods.
		4. solve total differential equation using method of auxiliary equation method & method of homogeneous differential equations.
		5. use beta & gamma functions & their properties to evaluate integrals.
		6. form difference equation for a given solution, solve nonhomogeneous linear difference equation, & formulate Fibonnaci difference equation & solve it.
T.Y. B.Sc.	MTH-351: Topics in Metric Spaces	1. identify countable sets, equivalent sets.

		2. discuss algebraic structure Metric Space, continuity in metric space, open sets, closed sets, homeomorphismin metric space.
		3. identify connected sets, bounded sets, totally bounded sets, complete metric space, compact metric space.
	MTH-352: Integral Calculus	1. discuss Riemannintegration with it's properties
		2. identifywhethere MVTs of integral calculus are applicable to given function.
		3. discuss convergence of improper integral.
		4. discuss series solution of Lgendre's differential equation.
	MTH-353: Modern Algebra	1. identify normal subgroup, discuss quotient group, isomorphism in groups.
		2. discuss permutation group & its properties.
		3. identify algebraic structure ideal, maximum ideal, prime ideal, discuss whether two rings are isomorphic or not.
		4. discuss whether a polynomial is reducible over the given field.
	MTH-354: Lattice Theory	1. identifyposet& chain, discuss their properties, draw poset diagram
		2. identify algebraic structure lattice, sublattice, distributive lattice.
		3. identify prime ideals of lattice, homomorphic lattices, modular lattices & discuss their properties.
	MTH-355(B): Elementary Number Theory	1. identify prime numbers & discuss their properties, solve Diophantine equation.
		2 solve linear congruence relation, solve simultaneous system of linear congruence relation,factorize the given number using Fermat factorization method.
		3. identify Perfect number, Mersenne number, Fermat number, Fibonnaci number
		4. expand given fraction as a continued fraction, solve Deophantine equation using continued fraction.
	MTH-356(A): Vector Analysis	1. identify vector function of single variable, discuss it's continuity, differentiability, use vector function to define velocity & acceleration of a particle, vector function of two &three variables, their partial derivatives.

		2. use differential operators like gradient of a scalar point function, curl of a vector point function.
		3. evaluate vector integrals, line integrals, surface integrals, volume integrals
		4. discuss applicability of Green's &Stoke's theorem.
	MTH-361: Measure and integration Theory	1. identify measurable sets & discuss their properties.
		2. identify measurable functions & discuss their properties.
		3. defineLebesgue integral for bounded , unbounded function & their properties.
		4. discuss applicability of Fatou's lemma, Lebesgue dominated convergence theorem.
	MTH-362: Method of Real Analysis	1. test the convergence & uniform convergence of sequence of real numbers.
		2. test the convergence of series of real numbers using comparison test, limit comparison test, ratio test, root test, cauchy's condensation test.
		3. test convergence of series of function using Weierstrass M-test, term by term differentiation & integration of series of real valued function.
		4. obtain Fourier series of periodic function & discuss it's convergence.
	MTH-363: Linear Algebra	1. identify algebraic structure vector space, subspace, quotient space, LI & LD vectors
		2. find basis & dimension of vector space.
		3. identify Range & Null space, discuss applicability of Rank-Nullity theorem.
		4. Identify linear transformation, invertible linear transformation& represent it in matrix form.
		5. Find eigen values, eigen vectors, minimal polynomial of a square matrix & verify Cayley Hamilton theorem.
	MTH-364: Ordinary and Partial Differential Equation	1.Solve exact differential equations of second & third order.
		2. Solve linear differential equation of second order
		3. Findseries solution of second & third order differential equation
		4. Solve partial differential equations of first order.

	MTH-365(A): Optimization Techniques	1.formulate LPP & obtain graphical solution, solve LPP using simplex method
		2.formulate TP & obtain initial solution, obtain optimum solution of TP by MODI method
		3. formulate AP & solve it using Hungarian technique.
		4. formulate two person zero sum game & solve it using analytical & graphical method.
	MTH-366(A): Applied Numerical Methods	1. Solve simultaneous system of linear equation using method of factorization, Crout's method, Gauss Seidal method & relaxation method
		2. obtain first & second order derivatives using Newtons forward & backward difference formulae,
		3. evaluate double integral using Trapezium rule &simpson's rule.
		4. obtain cubic spline approximation of a function.
		5. solve boundary value problem in ordinary & partial differential equation.