DEPARTMENT OF MATHEMATICS

Dr. C. S .RAO P.G. CENTRE(A): SRI Y.N .COLLEGE (AUTONOMOUS)

PROGRAMME OUTCOMES,PROGRAMME SPECIFIC OUTCOMES & COURSE OUTCOMES

(With effect from the admitted batch of **2020-2021** Academic Year**)**

Programme Outcomes: The study of M.Sc. degree programme will enable the students:

1. To obtain through knowledge in Pure Mathematics.
2. To obtain a basic knowledge in research & methodology.
3. To develop aptitude skills and skill based knowledge.
4. To improve logical and reasoning capacity.
5. To receive training to face SET/NET examinations.

Programme Specific Outcomes: The study of M.Sc. degree programme will enable the students:

1. To become an individual academic excellence in the discipline of Mathematics.
2. To acquire knowledge for research programme.
3. To be an entrepreneur for training SET/NET examinations.
4. To been capable of executing research and research projects
5. To become a Software professional.

COURSE OUTCOMES

I -SEMESTER

PAPER CODE	TITTLE OF THE PAPER	COURSE OUTCOMES
M101	ALGEBRA-I	➢ To discuss Normal Subgroups and Normal series like Isomorphism theorem and Automorphism. ➢ To explain Structure theorem of Groups like Finitely generated Abelian group and Sylow's theorem ➢ To discribe Ideal's and Homomorphism, Unique Factorization domain and Euclidean domains.
M102	REAL ANALYSIS-I	➢ To describe the Basic Topology and Numerical Sequences & Series. ➢ To explain about Continuity like Continuity and Connectedness & Continuity and Compactness. ➢ To Understand some special theorems of Differentiation like Mean value theorems and Taylor's theorem and further more learn about Differentiation of vector valued functions.
M103	DIFFERENTIAL EQUATIONS	➢ To discuss the second order linear differential equations and analyze homogeneous equation with constant coefficients, undetermined coefficients and method of variation of parameters. ➢ To explain Oscillation theory and Boundary value problems like Eigen values and Eigen functions. ➢ To describe Power series solutions and Systems of first order equations.
M104	TOPOLOGY	➢ To discuss the basic concepts of Sets and Functions and also know about Countable Sets & Uncountable Sets, further more about Partitions and equivalence relations. ➢ To learn about Metric spaces like open sets, closed sets and continuous mappings and also learn about Euclidean and unitary spaces. ➢ To describe Compactness like compact spaces, Product of spaces and discuss about some important theorems like Tychnoff's Theorem and Ascoli's theorem.
M105	DISCRETE MATHEMATICS	➢ To discuss lattices as partially ordered sets, some properties of lattices, lattices as algebraic systems. ➢ To acquire the knowledge from Boolean forms and free Boolean algebras, values of Boolean expressions. ➢ To Describe representations and minimizations of Boolean functions and to explain finite state machines, Introductory sequential circuits, equivalence of Finite state Machines.

II- SEMESTER

PAPER CODE	TITTLE OF THE PAPER	COURSE OUTCOMES
M201	ALGEBRA-II	➢ To discuss about Rings of Fractions and Algebraic Extensions of Fields. ➢ To explain Normal and Separable extensions like Splitting fields, Multiple roots and Finite fields. ➢ To discuss about Galois theory and it's applications to classical problems like cyclic extensions, Roots of Unity and Cyclotomic polynomials.
M202	REAL ANALYSIS-II	➢ To describe the Riemann stieltjes Integral and Sequences and Series of the functions like Uniform convergence, Uniform convergence and Continuity and Integration further more know about Equicontinuous families of functions,the stone wierstrass theorem. ➢ To explain the concept of Power Series and Functions of Several Variables like linear transformations ,the contraction principle and the inverse function theorem. ➢ To learn about the the Implicit function theorem,the Rank theorem and further more about Derivatives of higher order and Differentiation of integrals.
M203	COMPLEX ANALYSIS-I	➢ To discuss the elementary properties and examples of Analytic functions like Power series and Mobius transformations. ➢ To study complex integration and analyze Riemann-Stiltjes integrals, Cauchy theorem and Integral formula. ➢ To describe classification of Singularities, Residues and argument principle.
M204	LINEAR ALGEBRA	➢ To Explain elementary canonical forms, annihilating polynomials, invariant subspaces. ➢ To Describe direct –sum decompositions, invariant direct-sums. ➢ To Acquire the knowledge in the Jordan forms, computation of invariant factors, semi simple operators.
M205	PROBABILITY&STATISTICS	➢ It gives insight about the concepts, definitions and theorems of Probability and analyze the Probability distributions like Binomial, Poisson and Normal distributions. ➢ Describe correlation and regression analysis concepts. ➢ Understand the concepts of sampling and explain the large sample test.

III- SEMESTER

PAPER CODE	TITTLE OF THE PAPER	COURSE OUTCOMES
M301	FUNCTIONAL ANALYSIS	➢ To discuss the Banach spaces definition with examples, continuous linear transformation, the Hahn- Banach theorem and the natural imbedding of N in N^{**}. ➢ To discuss Hilbert spaces the definition and some simple properties, orthogonal complements and orthonormal sets. ➢ To explain Finite- dimensional spectral theory Matrices, determinants and the spectrum of an operator and the spectral theorem.
M302	LEBESGUE THEORY	➢ To discuss Algebra of sets, Lebesgue measure, Outer measure, Measurable set and Lebesgue measure etc. ➢ To discuss the Riemann integral, the Lebesgue integral of a bounded function over a set of finite measures etc. ➢ To discuss Differentiation of monotonic functions, functions of bounded variation, differentiation of an integral, absolute continuity, Lp- Spaces the Holder's and Minkowski inequalities etc.
M303	ANALYTICAL NUMBER THEORY	➢ To discuss basic concepts of arithemetical functions and dirichlet multiplication like Mobius function μ(n), Euler quotient function φ(n), Mangoldt function $\Lambda(n)$, Multiplicative functions, Liouville's function λ(n), Divisor functions $\sigma_\alpha(n)$- and Generalized convolutions. ➢ To explain Averages of arithemetical functions, big oh notation, Euler's summation formula, The average order of d(n), The average order of the divisor functions $\sigma_\alpha(n)$, The average order of φ(n), application to the distribution of lattice points visible from the origin and applications to μ (n) and $\Lambda(n)$. ➢ To discuss some elementary theorems on the distributions of prime numbers chebyshev's function ψ(x) and ϑ(x), Relations connecting ϑ(x) and π(x), Some equivalent forms of the prime number theorem, Shapiro's Tauberian theorem, Definition and basic properties of congruences, Euler-Fermat theorem, Polynomial congruences modulo p. Lagrange's theorem and it's applications, Chinese remainder Theorem and it's applications etc.

M304	PARTIAL DIFFERENTIONAL EQUATIONS	➢ To discuss about basics of partial differential equations and method of solutions of dx/P = dy/Q = dz/R and know about pfaffian differential forms and equations and their solutions in three variables. ➢ To describe linear & non-linear equations of the first order and solving the orthogonal surfaces and compatible systems of first order equations further more about some methods like,charpit's method,jacobi's method. ➢ 3. To solve the second order partial differential equations and discuss about solutions f linear hyperbolic equations and explaining method of separation of variables,monger's method and further more about Laplace equation and some elementary solutions and solving boundary value problems and more about wave equation and elementary solution in one dimensional form.
M305	COMMUTATIVE ALGEBRA(ELECTIVE-I)	➢ To explain the concepts of Rings and ring homomorphism, ideals, quotient rings, prime ideals and Maximal ideals, nil radical and Jacobson radical. ➢ To study Modules and module homomorphisms, Sub modules and quotient modules, operations on submodules, direct sum and product, finitely generated modules and exact sequences. ➢ To discuss the topics Local Properties, Extended and Contracted ideals in rings of fractions and Primary decompostitions.

IV- SEMESTER

PAPER CODE	TITTLE OF THE PAPER	COURSE OUTCOMES
M401	MEASURE THEORY	➢ To discuss Convergence and Completeness, Measure spaces, Measurable functions, Integration, General convergence Theorems. ➢ To discuss Signed Measures, The Raydon-Nikodym Theorem, the Lp spaces, Outer Measure and Measurability, The Extension theorem, The Lebesgue - Stieltjes Integral and Product measures. ➢ To discuss Integral Operators, Inner Measure, Extension by sets of measure zero, caratheodory outer measure and Hausdroff Measure.
M402	NUMERICAL ANALYSIS	➢ To perform the iterations for the smallest root by using Bisection method, Regulafalsi method, NewtonRaphson method, Mullers method, Chebyshev method, Multipoint iterative method and secant method. ➢ To discuss the iterations for the smallest root by using Guass elimination method, Triangularization method, Cholesky method, Lagrange and Newton's divided difference interpolation, sterling and Bessel interpolation, Hermite interpolation, piecewise and Spline Interpolation method ➢ To find the smallest root by using Gauss Legendre Integration method, Euler's method, Taylor series method, Runge kutte second and forth order methods
M403	GRAPH THEORY	➢ To understand the basic concepts of graphs and about trees & fundamental circuits. ➢ To discuss about cutsets & cut vertices and planar & dual graphs, further more ,to learn about the matrix representation of graphs like, Incidence, Circuit,Path and Adjacency matrices of graphs. ➢ To explain about the concepts of coloring , covering and partitioning of graphs and at athe end of the chapter we learn about graph theory in operation research.
M404	LINEAR PROGRAMMING	➢ To study the concepts of formulation of Linear Programming problems, Graphical solution, General formulation and Simplex Method. ➢ To solve the problems by using the methods two-phase, Big-M, degeneracy, Concept of Duality in Linear Programming, Comparison of solutions of the Dual and its primal. ➢ Mathematical formulation of Assignment problem, Reduction theorem, Hungarian Assignment Method, Travelling salesman problem, Mathematical formulation of Transportation problem, North West corner rule, Lowest cost entry method, Vogel's approximation methods

M405	DISCRETE DYNAMICAL SYSTEMS(ELECTIVE-II)	➢ To discuss about Phase Portraits, Periodic Points and Stable Sets, Sarkovskii's theorem, Differentiability and its Implications. ➢ To explain Parameterized Families of Functions and Bifurcations; The Logistic Function Part I, The Logistic Function Part II Topological Conjugacy, The Logistic Function Part III and Newton's method. ➢ Numerical solutions of Differential Equations, The Dynamics of Complex functions, Quadratic Family and Mandelbrot Set