SYLLABUS M.SC MATHEMATICS – I SEMESTER
Advanced Abstract Algebra –I
Paper code: - MAT-101

Unit - I

Normal and Subnormal series of groups, Composition series, Jordan- Holder series.

Unit- II

Solvable and Nilpotent groups.

Unit- III

Extension filed Roots of polynomials, Algebraic and transcendental extensions, Splitting fields, Separable and inseparable extension.

Unit- IV

Perfect filed , Finite fields, primitive elements, Algebraically closed field.

Unit – V

Auto orphism of extension, Galois extension, Fundamental theorem of Galois theory Solution of polynomial equations by radicals, Insolubility of general equation of degree 5 by radicals.

Text Book :-
1. I.N. Herstein, Topics in Algebra, Wiley Eastern, New Delhi.
2. V. Sahai & V. Bisht, Algebra, Narosa Publishing House.

Reference:-
1. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, Basic Abstract Algebra, Cambridge University Press.
2. N. Jacobson, Basic Algebra, vol. II & VIII, Hindustan Publishing Company.
3. S. Lang, Algebra, Addison- Wesley.
4. I. S. Luther & I.B.S. Passi Algebra Vol-1,2,3, Narosa company.
5. Dr. H. K. Pathak Advanced Abstract Algebra.

M.Sc. (Mathematics) I Semester Syllabus 2022-23

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY & MEDICAL SCIENCES, SEHORE

SYLLABUS M.SC MATHEMATICS – I SEMESTER
Real Analysis
Paper code:- MAT-102

Unit - I
Definition and existence of Riemann- stieltjes integral and its properties, Integration and Differentiation, The Fundamental theorem of Calculus.

Unit- II
Integration of vector- valued function, Rectifiable curves, Rearrangement of terms of a series, Riemann's theorem.

Unit - III
Sequence and series of functions, point wise and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass $M-$ test, Abel's and Dirichlet's tests for uniform convergence, Uniform convergence and continuity, uniform convergence and Riemann-Stieltjes integration, uniform convergence and differentiation, Weierstrass approximation theorem, Power series, uniqueness theorem for power series, Abel's and Tauber's theorems.

Unit- IV
Function of several variables, liner transformations, Derivatives in an open subset of R_n, chain rule, Partial derivative, Interchange of the order of differentiation, Derivatives of higher orders, Taylor's theorem, Inverse function theorem.

Unit- V
Implicit function theorem, Jacobians, extremum problem with constraints, Lagrange's multiplier methods, Differentiation of integrads, Partitions of unity, Differential from, Stoke's Theorem.

Text Books:-
1. Water Rudin, Principles of Mathematical Analysis, McGraw Hill.

Reference:-
1. T.M. Apostal, Mathematical Analysis Narosa.
2. H.L. Rayden, Real Analysis, Macmillan (Indian Edition)
3. Dr. H.K. Pathak Real Analysis

M.Sc. (Mathematics) I Semester Syllabus 2022-23

SYLLABUS M.SC MATHEMATICS – I SEMESTER
Topology -I
Paper code:- MAT-103

Unit -I

Countable and uncountable sets, Infinite sets and the Axiom of choice, Cardinal numbers and its arithmetic, Schroeder- Bernstein theorem, Cantor's theorem and the continuum hypothesis, Zorn's lemma, Well- ordering theorem.

Unit -II

Definition and examples of topological spaces, Closed sets, Closure, Dense subsets, Neighborhoods, interior exterior and boundary, Accumulation points and derived sets, Bases and sub-bases, Subspaces and relative topology.

Unit -III

Alternate methods of defining a topology in terms of Kuratowski Closure Operator and Neighborhood Systems, Continuous functions and Homeomorphism.

Unit -IV
First and Second Countable spaces, Lindelof's theorems, Separable spaces, Second Countability and Separability.

Unit -V

Path-connectedness, connected spaces, Connectedness on Real line, Components, Locally connected spaces.

Text Books:-
1. J. R. Munkres, Topology- A first course, Prentice- Hall of India.

References:-
1. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw Hill.
2. K.D. Joshi: Introduction to general topology, Wiley Eastern.
3. Dr. H.K Pathak Introduction to general topology.

SYLLABUS M.SC MATHEMATICS – I SEMESTER
Complex Analysis -I
Paper code:- MAT-104

Unit -I

Complex integration, Cauchy- Goursat theorem, Cauchy integral formula, Higher order derivatives.

Unit –II

Morera's theorem, Cauchy's inequality, Liouville's theorem, The fundamental theorem of algebra, Taylor's Theorem.

Unit- III

The maximum modulus principle, Schwartz lemma, Laurent series, Isolated singularities, Meromophic Functions, The argument principle, Rouche's theorem, Inverse function theorem.

Unit – IV

Residues, Cauchy's residue theorem, Evaluation of integrals, Branches of many valued functions with special reference to $arg z \; log z, z^a$.

Unit – V

Bilinear transformation, their properties and classification, Definition and examples of conformal mapping .

Text Book:-
1. J.B. Convey, Functions of one complex variable, Spring verlag.

References:-
1. S. Ponnuswamy, Foundation of complex analysis, Narosa Publishing House.
2. L.V. Ahlfors. Complex analysis McGraw Hill.
3. Dr .H.K. Pathak Complex analysis.

M.Sc. (Mathematics) I Semester Syllabus 2022-23

SYLLABUS M.SC MATHEMATICS – I SEMESTER
Advanced Discrete Mathematics-I
Paper code:- MAT-105

Unit – I
Semi group and monoids, Sub semi groups and Sub monoids, Homomorphism of semi groups and monoids, Congruence relation and Quotient semi groups, Direct products, Basic Homomorphism Theorem.

Unit - II
Lattices-Lattices as Partially ordered sets, their properties, Lattices as Algebraic Systems, Sub lattices, Bounded lattices, Distributive Lattices, Complemented Lattices.

Unit - III
Boolean Algebra-Boolean Algebras as lattices, various Boolean identities, Joint irreducible elements, minterms, maxterms, minterm Boolean forms, canonical forms, minimization of Boolean functions, Application of Boolean Algebra to switching theory (using AND, OR & NOT Gates), the Karnaugh method.

Unit - IV
Graph Theory- Definition and types of graphs, Paths & circuits, Connected graphs, Euler graphs, weighted graphs (undirected), Dijkstra's Algorithm, Trees, Properties of trees, Rooted & Binary trees, spanning trees, minimal spanning tree.

Unit - V
Complete Bipartite graphs, Cut-sets, properties of cut sets, Fundamental Cut-sets & circuits, Connectivity and Separability, Planar graphs, Kuratowski's two graphs, Euler's formula for planar graphs.

Text Books :-
1. J.P Tremblay and Manohar, Discrete Mathematical structures, McGraw Hill.

References:-
1. C.L. Liu , Element of Discrete Mathematic, McGraw Hill.
2. Semyour Lipschutz / More Lipson , Discrete Mathematic, McGraw Hill.

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