

LESSON PLAN

CLASS: - M.Sc. (Maths)

SEMESTER:-1st Sem (2025-26)

Name : - Dr. Sandeep Kumar

Designation: Professor

Paper: Mathematical Analysis

Time Period	Syllabus to be covered
August, 2025	Riemann-Stieltjes integral, Existence and properties, Integration and differentiation, The fundamental theorem of calculus, Integration of vector-valued functions, Rectifiable curves.
Sept, 2025	Sequence and series of functions, Point wise and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass Mtest, Abel and Dirichlet tests for uniform convergence, Uniform convergence and continuity, Uniform convergence and differentiation, Weierstrass approximation theorem.
Oct, 2025	Power series, uniform convergence and uniqueness theorem, Abel theorem, Tauber theorem. Functions of several variables, Linear Transformations, Euclidean space R^n , Derivatives in an open subset of R^n , Chain Rule, Partial derivatives, Continuously Differentiable Mapping, Young and Schwarz theorems.
November, 2025	Taylor theorem, Higher order differentials, Explicit and implicit functions, Implicit function theorem, Inverse function theorem, Change of variables, Extreme values of explicit functions, Stationary values of implicit functions, Lagrange multipliers method, Jacobian and its properties..


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LESSON PLAN

CLASS: - M.Sc. (Maths)

SEMESTER:- 3rd Sem (2025-26)

Name : - Dr. Sandeep Kumar

Designation: Professor

Subject/Paper: - Elementary Topology

Time Period	Syllabus to be covered
August, 2025	Definition and examples of topological spaces. Comparison of topologies on a set, Intersection and union of topologies on a set, Neighbourhoods. Interior point and interior of a set, Closed set as a complement of an open set, Adherent point and limit point of a set, Closure of a set. Derived set. Properties of Closure operator, Boundary of a set, Dense subsets. Interior, Exterior and boundary operators, Alternative methods of defining a topology in terms of neighbourhood system and Kuratowski closure operator.
September, 2025	Relative (Induced) topology, Base and sub base for a topology. Base for Neighbourhood system. Continuous functions. Open and closed functions, Homeomorphism. Connectedness and its characterization. Connected subsets and their properties, Continuity and connectedness. Components, Locally connected spaces.
October, 2025	Compact spaces and subsets, Compactness in terms of finite intersection property, Continuity and compact sets. Basic properties of compactness. Closeness of compact subset and a continuous map from a compact space into a Hausdorff and its consequence. Sequentially and countably compact sets, Local compactness and one point compactification.
November, 2025	First countable, Second countable and separable spaces. Hereditary and topological property, Countability of a collection of disjoint open sets in separable and second countable spaces, Lindelof theorem. T_0 , T_1 , T_2 (Hausdorff) separation axioms, their characterization and basic properties.



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LESSON PLAN

CLASS: - M.Sc. (Maths)

SEMESTER:- 3rd Sem (2025-26)

Name : - Dr. Sandeep Kumar

Designation: Professor

Subject/Paper: - Graph Theory

Time Period	Syllabus to be covered
August, 2025	Definition and types of graphs, Walks, Paths and Circuits, Connected and Disconnected graphs, Applications of graphs, operations on Graphs, Graph Representation, Isomorphism of Graphs.
September, 2025	Eulerian and Hamiltonian paths, Shortest Path in a Weighted Graph, The Travelling Salesperson Problem, Planar Graphs, Detection of Planarity and Kuratowski Theorem, Graph Colouring.
October, 2025	Directed Graphs, Trees, Tree Terminology, Rooted Labeled Trees, Prefix Code, Binary Search Tree, Tree Traversal.
November, 2025	Spanning Trees and Cut Sets, Minimum Spanning Trees, Kruskal Algorithm, Prim Algorithm, Decision Trees, Sorting Methods.



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