

Code:MSM511 Real Analysis

Real number system and its order completeness, sequences and series of real numbers. Metric spaces: Basic concepts, continuous functions, Intermediate Value Theorem, Com

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4

References

Compactness, Heine-Borel Theorem.

Differentiation, Taylor's theorem, Riemann Integral, Improper integrals Sequences and series of functions, Uniform convergence, power series, Fourier series, Weierstrass approximation theorem, equicontinuity, Arzela-Ascoli theorem.

1. W. Rudin, Principles of Mathematical Analysis, McGraw-hill, 1976. 2. C.C. Pugh, Real Mathematical Analysis, Springer, 2002. 3. T. M. Apostol, Mathematical Analysis, 2nd Edition, Narosa, 2002. 4. G. F. Simmons, Introduction to Topology and modern Analysis, International Student edition, 1963.

Code:MSM512 Linear Algebra

Vector Spaces: , subspaces, bases and dimensions, co-ordinates, summary of row equivalent

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
invariant subspaces, simultaneous triangulation, simultaneous diagonalisation, direct sum decomposition, in variant direct sums, Jordan form and diagonalization.

Linear Transformations: Linear transformation, the algebra of linear transformation, Isomorphisms, representation of transformations by matrices.

References

Linear Transformations (contd) : Linear functionals, the double dual, the transpose of linear transformations

1. Kenneth Hoffman and Ray Kunze, Linear Algebra, Second edition, Prentice Hall of India Private Ltd, New Delhi, 1971. 2. Klaus Janich, Linear Algebra, Springer Verlag, 1994. 3. Paul R. Halmos, Linear Algebra Problem Book, The Mathematical Association of America, 1995.

Determinants: Commutative Rings, Determinant functions, Permutation and the uniqueness of determinants, Additional properties of determinants Elementary Canonical Forms: Introduction, characteristic values, annihilating polynomials,

Code:MSM513 Discrete Mathematics

Set theoretic operations and functions - Countable and uncountable sets - Mathematical induction and centers- BFS Algorithm.

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4

Mathematical induction - Binary relations - Pigeonhole principle - Recurrence- Discrete numeric functions Generating functions recurrence relations.

Lattices as algebraic systems - Principles of duality - Basic properties - Distributive and complemented lattices - Boolean lattices - Boolean algebra - Boolean functions and expressions.

Introduction to Graphs : The concept of a graph, Paths in graphs, Graphs and graph models, Graph terminology and special types of graphs, Bipartite graphs, Complete graphs, External graphs, Intersection graphs, Graph Isomorphism. Blocks, Cutpoints, bridges and blocks. Block graphs and cutpoint graphs. Trees - Properties of trees - Distance

Eulerian Graphs, Hamiltonian Graphs. Coverings and Matching : Coverings and independence, Critical points and lines, Matching, Maximum Matching Problem, Minimum covering problems. Representing Graphs : Adjacency matrix, Incidence matrix, Cycle matrix. Planarity : Plane and planar graphs, Outerplanar graphs, Kuratowski's theorem - coloring problems - basic ideas.

References

1. C.L.Liu, Elements of Discrete Mathematics, TMH ,2000.
2. J.P. Tremblay & R. Manohar, Discrete mathematical structures with applications to Computer Science,