MA832 THEORY OF HYPERGRAPHS 4-0-0-4

Hypergraphs: Basic Concepts.- First Definitions, Simple Reduction Hypergraph Algorithm, Algebraic Definitions for Hypergraphs, Matrices, Hypergraphs and Entropy, Similarity and Metric on Hypergraphs, Hypergraph Morphism; Groups and Symmetries, Generalization of Hypergraphs.

Graphs versus Hypergraphs: Graphs, Graphs and Hypergraphs, Intersecting Families, Helly Property, Subtree Hypergraphs, Conformal Hypergraphs, Stable (or Independent), Transversal and Matching, König Property and Dual König Property, linear Spaces.

Some Particular Hypergraphs: Interval Hypergraphs, Unimodular Hypergraphs, Balanced Hypergraphs, Normal Hypergraphs, Arboreal Hypergraphs, Acyclicity and Hypertree Decomposition, Planar Hypergraphs

Reduction-Contraction of Hypergraph: Introduction, Reduction Algorithms- Generic Algorithm, A Minimum Spanning Tree Algorithm (HR-MST).

Applications of Hypergraph Theory: A Brief Overview- Hypergraph Theory and System Modeling for Engineering, Chemical Hypergraph Theory, Hypergraph Theory for Telecomunmications, Hypergraph Theory and Parallel Data Structure, Hypergraphs and Constraint Satisfaction Problems, Hypergraphs and Database Schemes,Hypergraphs and Image Processing, Other Applications.

TEXT BOOKS/ REFERENCES:

1. Alain Bretto, **Hypergraph Theory – An Inrtoduction,** Springer International Publishing Switzerland, 2013.
2. Vitaly I. Voloshin, **Introduction To Graph And Hypergraph Theory,** Nova Science Publishers, Inc. New York, 2008.
3. C. Berge, **Graphs And Hypergraphs,** North-Holland Publishing Company, 1973.