

MA-413: INTRODUCTION TO COMBINATORICS

To basic counting principles, Permutations, Combinations. The injective and bijective principles, Arrangements and selections with repetitions. Graphs in Combinatorics.

The Binomial theorem, combinatorial identities. Properties of binomial coefficients, Multinomial coefficients, The multinomial theorem.

The Pigeonhole principle, Examples, Ramsay numbers, The principle of inclusion and exclusion, Generalization. Integer solutions. Surjective mapping, Stirling numbers of the second kind, The Sieve of Eratostheries, Euler ϕ -function, The Probleme des Manages.

Ordinary Generating Functions, Modelling problems. Partition of integers, Exponential generating functions.

Linear homogeneous recurrence relations, Algebraic solutions of linear recurrence relations and constant functions, The method of generating functions, A non-linear recurrence relation and Catalpa numbers

RECOMMENDED BOOKS:

1. A Tucker, Applied Combinatorics, John Wiley & Sons, New York, 2nd Edition, 1985.
2. C.C. Chen and K.M.Koh, Principles and Techniques in Combinatorics, World Scientific Pub. Co. Pte. Ltd, Singapore. 1992.
3. V.K.Balakrishnan, Theory and Problems of Combunatorics, Schaum's Outline Series, McGraw-Hill International Edition, Singapore, 1995.
4. C.L.Liu, Introduction to Combinatorial Mathematics, McGraw-Hill, New York, 1968.
5. J.H.van Ling & R.M. Wilson, A course on Combinatorics, 2nd Edition, Cambridge University Press, Cambridge, 2001.