The Department of Mathematics

2021–22–A term

Course Name Discrete Mathematics

Course Number 201.1.2201

Course web page
   https://www.math.bgu.ac.il//en/teaching/fall2022/courses/discrete-mathematics

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Office Hours https://www.math.bgu.ac.il/en/teaching/hours

Abstract

Requirements and grading[1]

Course topics

.1 Introduction: Sets, subsets, permutations, functions, partitions. Indistinguishable elements, multisets, binary algebra of subsets. Rules of sum and product, convolutions, counting pairs. Binomial and multinomial coefficients. Stirling numbers of second kind, definition and a recurrenat formula.

.2 Graphs: General notions and examples. Isomorphism. Connectivity. Euler graphs. Trees. Cayley's theorem. Bipartite graphs. Konig's theorem, P. Hall's theorem.

.3 The inclusion-exclusion method: The complete inclusion-exclusion theorem. An explicit formula for the Stirling numbers. Counting permutations under constraints, rook polynomials.

.4 Generating functions: General notion, combinatorial meaning of operations on generating functions. Theory of recurrence equations with constant coefficients: the general solution of the homogeneous equation, general and special cases of nonhomogeneity. Catalan numbers. Partitions of numbers, Ferrers diagrams. Exponential generating functions, counting words, set partitions, etc.

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[1]Information may change during the first two weeks of the term. Please consult the webpage for updates