

## The Department of Mathematics

2017–18–B term

**Course Name** Introduction to Discrete Mathematics

**Course Number** 201.1.9661

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/spring2018/courses/introduction-to-discrete-mathematics>

**Lecturer** Prof. Mikhail Muzychuk, <muzychuk@bgu.ac.il>, Office 305

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

### Abstract

### Requirements and grading<sup>1</sup>

### Course topics

Sets. Set operations and the laws of set theory. Power set. Cartesian product of sets. The rules of sum and product. Permutations, combination, distributions. The Binomial Theorem. The well-ordering principle: mathematical induction. The principle of inclusion and exclusion. The pigeonhole principle. Recurrence relations. Generating functions. Relations and functions. Properties of relations. Equivalence relations and their properties. Partial order. Functions and their properties. Injective, surjective functions. Function composition and inverse functions. Graph, subgraph, complements. Graph isomorphism. Euler's formula. Planar graph. Euler trails and circuits. Trees. Propositional logic. Syntax of propositional logic. Logical equivalence. The laws of logic. Logical implication. Equivalence and disjunctive normal form. Predicate logic. Syntax of predicate logic. Models. Equivalence of formulas. Normal form. Algebraic structures. Rings, groups, fields. The integer modulo  $n$ . Boolean algebra and its structure.

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<sup>1</sup>Information may change during the first two weeks of the term. Please consult the webpage for updates