

The Department of Mathematics

2022–23–B term

Course Name Discrete Geometry

Course Number 201.2.0191

Course web page

<https://www.math.bgu.ac.il/en/teaching/spring2023/courses/discrete-geometry-ea8820de-98d7-4924-a248-0b03c3b1566d>

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

Abstract

Requirements and grading¹

Course topics

- Fundamental theorems and basic definitions: Convex sets, separation, Helly's theorem, fractional Helly, Radon's theorem, Caratheodory's theorem, centerpoint theorem. Tverberg's theorem. Planar graphs. Koebe's Theorem.
- Geometric graphs: the crossing lemma. Application of crossing lemma to Erdos problems: Geometric Incidences, Repeated distance problem, distinct distances problem. Selection lemmas. Counting k -sets. An application of incidences to additive number theory.
- Coloring and hitting problems for geometric hypergraphs : VC -dimension, Transversals and Epsilon-nets. Weak eps-nets for convex sets. (p, q) -Theorem, Conflict-free colorings.
- Arrangements : Davenport Schinzel sequences and sub structures in arrangements.
- Geometric Ramsey and Turan type theorems: Application of Dilworth theorem, Erdos-Szekeres theorem for convex sets, quasi-planar graphs.

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