The Department of Mathematics

2019–20–A term

Course Name Discrete Geometry

Course Number 201.2.0191

Course web page
https://www.math.bgu.ac.il//en/teaching/fall2020/courses/discrete-geometry

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

Abstract

Requirements and grading[1]

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 hiting 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.

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