אוניברסיטת
בן-גוריון בנגב

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`

Lecturer Prof. Shakhar Smorodinsky, <shakhar@bgu.ac.il>, Office

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.

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