Syllabus - Extremal Graph Theory

Instructor: Balázs Patkós
Webpage: www.renyi.hu/∼patkos/teachisu.html but all information on canvas
email: patkos@iastate.edu

- (Hyper)graph Turán problems: density exists, Turán's theorem, Kővári-Sós-Turán, supersaturation, Erdős-Stone-Simonovits theorem, saturation problems

- Ramsey theory

- Probablistic methods

- Regularity lemma and its applications

- Sperner's theorem and its generalization by Erdős

- Shadow theorem

- Intersection theorems: Erdős-Ko-Rado, Hilton-Milner

- Intersection and chain conditions: Milner, Frankl, Balogh-Linz-Patkós

- Forbidden subposet problems

- Saturation versions of forbidden subposet problems.

- Random version of Sperner's theorem and some words on the (hypergraph) container method

- Applications of set systems to combinatorial search theory

Homework and Grading: every other Monday a homework assignment of 3 exercises is handed out with a 2-week deadline. These six assignments give 60% of the final grade with all exercises equally weighted.

Every student has to give a 20-25-minute presentation on the main findings of a relatively recent research paper (agreed by the instructor) at the end of the semester. The presentation gives 30% of the final grade.

Class participation gives 10% of the final grade.