

Approximation Algorithms in Combinatorial Optimization

CO 754, Winter 2021

Instructor: Jochen Koenemann.

This course is intended as a broad introduction to approximation algorithms for hard combinatorial optimization problems. The course will cover a variety of techniques, including deterministic and randomized rounding of linear programming formulations, primal-dual algorithms, graph decomposition, metric embeddings, semidefinite programming. Topics will include classic results through recent work; open problems will be mentioned throughout.

Suggested reading: The course will primarily use the textbook “The Design of Approximation Algorithms” by Williamson and Shmoys (WS).

We will also use other textbooks on occasion as well as research papers. Sources will be mentioned whenever the course strays from (WS).

Prerequisites: we will assume basic knowledge of graph theory (at the level of Chapter 1 of Diestel’s book *Graph Theory*), as well as fundamentals of linear optimization (e.g., Chapters 4-6 of Matousek & Gärtner’s book *Understanding and Using Linear Programming*).

Course homepage: [Learn](#)