

Discrete Optimization with Application in Communication Networks (6 credits)

Teacher: Di Yuan

This course is intended to provide knowledge and training in applied discrete optimization and integer programming. The course introduces the basics of discrete optimization, mathematical modeling, and integer linear programming to form a theoretical framework. The optimization techniques are illustrated using applications originating from communication networks. The course also aims at providing knowledge and understanding in developing efficient discrete mathematical models and methods.

Course contents:

- Review of linear programming
- Integer linear programming and combinatorial optimization
- Classical combinatorial optimization problems
- Problem complexity
- Bounding, duality, and relaxation
- Dynamic programming
- Greedy and search heuristics
- Mathematical modeling
- Impact of modeling on problem solving
- Multicommodity flow problems
- Minimum-cost network design
- Minimum-power coverage in mobile networks
- Optimal scheduling in wireless networks

Examination: Take-home assignments

The first two lectures take place at 10-12am, May 5 (ITC 1345) and 10-12am, May 8 (ITC 1345). The dates for the remaining lectures will be set together with the course participants during the first lecture.