Heuristics for Mathematical Optimization

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Timetable: 20 hrs (see Class Schedule on https://phd.dei.unipd.it/course-catalogues/)

Enrollment: students must enroll in the course using the Enrollment Form on the PhD Program eLearning platform (requires SSO authentication).

Course requirements:
- Moderate programming skills (on a language of choice)
- Basics in linear/integer programming.

Examination and grading: Final programming project.

SSD: Information Engineering

Aim: Make the students familiar with the most common mathematical heuristic approaches to solve mathematical/combinatorial optimization problems. This includes general strategies like local search, genetic algorithms and heuristics based on mathematical models.

Course contents:
- Mathematical optimization problems (intro)
- Heuristics vs exact methods for optimization (intro)
- General principle of heuristic design (diversification, intensification, randomization)
- Local search-based approaches
- Genetic/population based approaches
- The subMIP paradigm
- Applications to selected combinatorial optimization problems: TSP, QAP, facility location, scheduling.

References:
1. Gendreau, Potvin “Handbook of Metaheuristics”, 2010