Heuristics for Mathematical Optimization

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**Timetable:** 20 hrs. see 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