

# Heuristics for Mathematical Optimization

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**Timetable:** 20 hours. Class meets every Tuesday and Wednesday from 14:00 to 16:00. First lecture on February 26th, 2019. Room: DEI/D meeting room, Dept. of Information Engineering, DEI/D Building, 1st floor.

## **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
2. Marti, Pardalos, Resende Handbook of Heuristics, 2018