

**Heuristic Search Methodologies, 8.0 credits**

Heuristiska sökmetoder, 8.0 hp

Third-cycle education course

MAI0083

Dept of Mathematics

Valid from: First half-year 2023

**Approved by**  
Head of Department

**Approved**

**Registration number**

## Entry requirements

Undergraduate courses in mathematics, optimization and computer science.

## Contents

- Common concepts for metaheuristics: optimization models and methods, representation, objective function, constraint handling, performance analysis.
- Single-solution based metaheuristics: fitness landscapes, local search, simulated annealing, tabu search, variable neighbourhood search.
- Population-based metaheuristics: evolutionary algorithms, swarm intelligence.
- Metaheuristics for multiobjective optimization: multiobjective optimization, fitness assignment strategies, performance evaluation and Pareto front structure.
- Hybrid metaheuristics: combining metaheuristics with mathematical programming, constraint programming, machine learning and data mining. Parallel design of metaheuristics.

## Educational methods

Seminars where the participants present the course topics and solutions to selected exercises from the book. Implementation projects on applications of metaheuristics.

## Examination

Active participation with presentation of course topics, solutions to exercises and results of projects.

## Grading

One-grade scale

## Course literature

Metaheuristics: from design to implementation, E.-G. Talbi, Wiley, 2009.