

Prescriptive Analytics



ECTS

4 crédits



Hourly volume

Introducing

Algorithmics & programming (I2MIIF11, I2MIIF21).
Fundamentals in Computer Science (I4IRIF11), Intelligent
Systems (I4IRSD11)

Objectives

This course addresses several efficient models for processing data encountered in industrial combinatorial problems. These models are based on logical inference and mathematical optimisation techniques : constraint satisfaction problems (CSPs), boolean satisfiability (SAT)

and integer linear programming (ILP).

In the first part (CSPs), students are expected to understand and to be able to apply the main constraint propagation techniques and solving strategies, by hand, but are also initiated to programming tools that integrate general solvers (ex : CPLEX) during practical works.

In the SAT modeling part of this course, students are initiated to some propagation and heuristic solving techniques used in SAT solvers (DPPLL, Implication Graphs, Conflict Analysis, Two-watched literals algorithm). Various applications problems such as allocation, graph colouring, scheduling serve as training examples for SAT encoding.

In the last part (MILPs), students will have to translate industrial problems into mixed-integer linear programs, then to solve them efficiently using branching algorithms or decomposition methods, embedded in existing tools such as CPLEX.

Practical info

Location(s)

 Toulouse

Necessary prerequisites