

# COURSE DETAIL

## RESOURCES OPTIMIZATION

**Country**

Italy

**Host Institution**

University of Bologna

**Program(s)**

University of Bologna

**UCEAP Course Level**

Upper Division

**UCEAP Subject Area(s)**

Engineering

**UCEAP Course Number**

178

**UCEAP Course Suffix****UCEAP Official Title**

RESOURCES OPTIMIZATION

**UCEAP Transcript Title**

RESOURCES OPTMZTN

**UCEAP Quarter Units**

6.00

**UCEAP Semester Units**

4.00

## **Course Description**

This course is part of the Laurea Magistrale program. The course is intended for advanced level students only. Enrollment is by permission of the instructor. The objective of the course is to present the most effective techniques for the solution of complex decisional problems arising in the optimal planning and management of large-scale systems concerning both the public and the private sectors. Mathematical models and heuristic algorithms for the practical solution of the corresponding optimization problems are described. Particular attention is given to the algorithmic and implementation aspects. Applications of the proposed techniques to real-world problems are presented and analyzed. The course discusses topics including: basic integer programming optimization: integer programming models, formulations, relaxations; basic heuristic approaches: constructive algorithms and local search procedures, examples for KP01 and TSP; worst-case performance analysis; metaheuristics: Multistart, Tabu Search, Simulated Annealing, Genetic Algorithms, Iterated Local Search, Variable Neighborhood Search, Large Neighborhood Search, Ruin and Recreate, and Ant Systems; optimization on graphs: shortest path, minimum spanning tree, and maximum flow; heuristic and metaheuristic algorithms for difficult combinatorial optimization problems; and real-world applications. Prerequisites for this course are: basic knowledge of Operations Research, as well as the implementation of computer codes and complexity theory.

### **Language(s) of Instruction**

English

### **Host Institution Course Number**

35192

### **Host Institution Course Title**

RESOURCES OPTIMIZATION M

### **Host Institution Course Details**

<https://www.unibo.it/en/teaching/course-unit-catalogue/course-unit/2022/376556>

**Host Institution Campus**

BOLOGNA

**Host Institution Faculty****Host Institution Degree**

LM in ENGINEERING MANAGEMENT

**Host Institution Department**

Industrial Engineering

**Course Last Reviewed**

2022-2023

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