Operations Research Complements

Objectives. The course aims at presenting some algorithmic techniques in Operations Research, for solving mixed-integer linear programming as well as non-linear programming problems.

Programme

    1. Integer and mixed-integer linear programming.
- Linear programming (recall).
- Geometric interpretation of (M)ILP, polyhedral theory.
- Cutting planes.

    2. Implicit enumeration algorithms
- Branch-and-bound, branch-and-cut.
- Balas' algorithm for 0-1ILP
- Dynamic programming

    3. Lagrangean relaxation

    4. Column generation, branch-and-price

    5. Non-linear programming
- Unconstrained optimization
- Constrained optimization

Prerequisites
Computer programming, Algorithms and data-structures, Operations research.

Teaching material
- F. Maffioli: "Elementi di programmazione matematica", Casa Editrice Ambrosiana, 2000.
- G. Nemhauser, L. Wolsey, "Integer and Combinatorial Optimization", Wiley 1999.