Academic Year 2019/2020
Program of Optimization (6 CFU)
Master degree in Data Science for Management
(Professor P. Daniele)

Linear Programming (LP):
Standard form of LP problems. The graphic method. The symplex method. Entrance and exit criteria for the basis. Research of the solution of a LP problem with equality constraints using the 2 phases method. Numerical and parametric examples. Duality in LP: canonical form of a LP problem, relationship between the 2 objective functions, strong duality theorem. The symplex method for the dual problem. Interpretation of the dual problem of the optimal diet. Sensitivity analysis: small changes in the coefficients of the objective function

Integer Linear Programming (ILP):
Integer Linear Programming problems: presentation of the models and the Branch & Bound method. Numerical examples.

Integer Linear Programming 0-1:
The knapsack problem: presentation of the model and the modified Branch & Bound method.

Software:
Excel, Wolfram Alpha, Wolfram Sandbox, Mathematica and LINGO for the resolution of LP problems.

Graph Theory:
Matrices for the representation of graphs. Kruskal, Dijkstra, Bellman-Kalaba algorithms. Shortest path problems with LP.

Books:

- J. Stacho, Introduction to Operations Research, Columbia University, NY,
- http://www.cs.toronto.edu/~stacho/public/IEOR4004-notes1.pdf
- M.S. Bazaraa, J.J. Jarvis, H.D. Sherali, Linear Programming and Network Flows, John Wiley & Sons, 2009.
- F. Hillier, G.J. Liebermann, “Introduction to Operations Research”, McGraw-Hill, 2006.