Università degli Studi di L'Aquila - Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica

Course catalogue

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Programme of Module "Decision Models"

- Code: DT0342
- Type of course unit: Compulsory (Master Degree in Applied Data Science curriculum Data for Smart City), Compulsory (Master Degree in Applied Data Science curriculum Data for Life Science)
- Level of course unit: Postgraduate Degrees
- Semester: 1

Number of ects credits: (Master Degree in Applied Data Science) 6 (workload 150 hours)

Teachers: Claudio Arbib (Claudio.Arbib@univaq.it)

1	**Course objectives**	Understand the role of combinatorial optimization models in technical-scientific applications. Formulate and solve combinatorial optimization problems in terms of 01 linear optimization. Get familiar with some fundamental algorithms for specific problems.
2	**Course content and learning outcomes (dublin descriptors)**	Topics of the module include: • Decision processes: definitions and phases • Deciding and valuing: relations and numbers, preferences as relations, utilities as values, Pareto curves. • Representation of individual decisions: alternatives, decision matrices, zero-sum games, Stackelberg games. • (Integer) Linear Programming models and algorithms. • Decision making under uncertainty/ignorance: stochastic, Bayesian and robust models. • Social decision theory. • Decision modello and data analysis: single-multi decision maker, single-multi objective. Descriptive, predicative and prescriptive models, examples. Linear and non-lineare regression as a linear optimization problem, the minimum square method. Classification problems (p-median, p-centre). Separation and Overlap.
3	**Course prerequisites**	Basics of Linear Algebra. Linear operators, finite-dimensional matrices and vectors.
4	**Teaching methodsand language**	Lectures, exercises, seminars **Language**: English
5	**Assessment methods**	Written test (possibly divided into two intermediate tests) + oral test