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

Course catalogue

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Programme of Module "Ricerca Operativa"

- Code: F0140
- Type of course unit: Compulsory (Bachelor Degree in Computer Science curriculum General)
- Level of course unit: Undergraduate Degrees
- Semester: 2

Number of ects credits: (Bachelor Degree in Computer Science) 6 (workload 150 hours)

Teachers: Stefano Smriglio (Stefano.Smriglio@univaq.it)

1	**Course objectives**	Introduce the student to the formulation of basic Optimization problems, particularly Linear Optimization problems, and train him/her to the related solution algorithms.
2	**Course content and learning outcomes (dublin descriptors)**	Topics of the module include: • Optimization problems: decision varibles, objectives and constraints; modeling techniques and model classification • Convex optimization problems; local and global optima • Geometry of Linear Programming • The Simplex method • Duality theory in Linear Programming and its applications • Dual interpretation of the simplex method and the dual simplex method On successful completion of this module, the student should : • Acquire the knowledge of Optimization problems and of the mathematical modeling techniques for complex decisions. Acquire the knowledge of some solution algorithms for Linear Programming problems. • Acquire the ability to recognize optimization problems and develop mathematical models of decision-making problems. Acquire the ability of computing solutions of linear programming problems • Acquire autonomy in modeling and algorithmic choices for problems related to complex decision-making • Be able to hold a conversation and to read texts on topics related to the modeling of decision problems and Linear Programming • Acquire the ability of upgrading flexible knowledge and skills in the field of Optimization and related problems that arise in various areas, such as mathematics, computer science and management science
3	**Course prerequisites**	Vector space, scalar product, matrix product, inverse matrix
4	**Teaching methodsand language**	teaching lessons **Language**: Italian **Reference textbooks** • Dimitris Bertsimas and John N. Tsitsiklis, ***Introduction to Linear Optimization***. Athena Scientific. 1997. • Matteo Fischetti, ***Lezioni di Ricerca Operativa***. Progetto Libreria Padova. 1995. • Antonio Sassano, ***Modelli e Algoritmi della Ricerca Operativa***. Franco Angeli. 1992.
5	**Assessment methods**	1. paper test consisting of various exercises (problem formulation, insights about algebraic or geometric problems properties, problem solution by know algorithms) 2. oral test about theoretical topics; this is accessible only for the students who earned a passing grade at the paper test; NOTE: a sufficient paper test allows the student only for the oral at the same date, but NOT for next dates. 3. A mid-term test is also planned: a

		positive grade to it allows the student to skip the corresponding topics in the final test.