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

Course catalogue

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Programme of Integrated course "Networks And Decision Models"

This course is composed of 2 Modules: 1) Decision Models, 2) Networks

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**	
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.
3	**Course prerequisites**	
4	**Teaching methodsand language**	**Language**: English
5	**Assessment methods**	

Programme of Module "Networks"

- Code: DT0341
- 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: 2

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

Teachers: Giovanni Stilo (giovanni.stilo@univaq.it)

1	**Course objectives**	The student will be able to manage and analyze networks from several aspects.
2	**Course content and learning outcomes (dublin descriptors)**	Topics of the module include: • Fundamentals of graph theory and Notation • Linear Algebra and Norms • Node Similarity Measures and algorithms • Network Generators • Key Players of a Network and Centralities measures • Networks and communities: algorithms and metrics. On successful completion of this module, the student should : • On successful completion of this course, the student should: Understand: • Where graphs are, why they are important, and what are new applications; • The main challenges from data mining perspective:

		Learn: • Analyze networks to understand the properties and the behaviors of individuals • Think in a research perspective (novelty,clarity,...) • Solve practical problems
3	**Course prerequisites**	- Knowing at least one Programming Language. - Notions of linear algebra.
4	**Teaching methodsand language**	**Language**: English **Reference textbooks** • Chakrabarti, D. and Faloutsos, C., ***Graph mining: laws, tools, and case studies.***. 2012. • Aggarwal, C.C. and Wang, H. eds, ***Managing and mining graph data***. Springer. 2010. • Easley, D. and Kleinberg, J., ***Networks, crowds, and markets: Reasoning about a highly connected world***. Cambridge University Press. 2010.
5	**Assessment methods**	Project, oral presentation of the project and discussion of course topics.