



Programme of Course "Mathematical Economics and Finance"

- Code: DT0110
- Type of course unit: Elective (Bachelor Degree in Mathematics curriculum Generale), Elective (Master Degree in Mathematics curriculum Generale), Elective (Master Degree in Mathematical Engineering curriculum Comune)
- Level of course unit: Undergraduate Degrees, Postgraduate Degrees
- Semester: 1

Number of ects credits: (Master Degree in Mathematics) 6 (workload 150 hours), (Master Degree in Mathematical Engineering) 6 (workload 150 hours), (Bachelor Degree in Mathematics) 6 (workload 150 hours)

Teachers: Massimiliano Giuli (massimiliano.giuli@univaq.it)

1	Course objectives	I present and organize the analytical foundations underlying modern economics and finance.
2	Course content and learning outcomes (dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> • Sperner's lemma • The Knaster-Kuratowski-Mazurkiewicz lemma • Brouwer's fixed point theorem • Variational inequalities and equilibrium problems • Generalized monotonicity and convexity • Brézis-Nirenberg-Stampacchia theorem and Fan's minimax principle • Continuity of correspondences • Browder, Kakutani and Fan-Glicksberg fixed point theorems • Gale-Nikaido-Debreu theorem • Nash equilibrium of games and abstract economies • Walrasian equilibrium of an economy • An application to traffic network <p>On successful completion of this module, the student should :</p> <ul style="list-style-type: none"> • Know the fundamental fixed point theorems for set-valued maps and the basic existence results for equilibrium problems and variational inequalities. • Explain some interconnections among these various results. • Apply this analysis to game and economic theory
3	Course prerequisites	I assume familiarity with vector and topological spaces, and with the standard model of the real numbers. I assume that you know the basic facts about metric spaces, normed and seminormed spaces, Banach and Hilbert spaces.
4	Teaching methods and language	Language: English
5	Assessment methods	Written and oral