



Programme of Course "Meccanica Razionale"

- Code: F0503
- Type of course unit: Compulsory (Bachelor Degree in Mathematics curriculum Generale)
- Level of course unit: Undergraduate Degrees
- Semester: 2

Number of ects credits: (Bachelor Degree in Mathematics) 9 (workload 225 hours)

Teachers: Immacolata Merola (immacolata.merola@univaq.it)

1	Course objectives	This course aims to enable the students to understand Classical and Analytical Mechanics and to handle the most important related mathematical tools.
2	Course content and learning outcomes (dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> • Principles and mathematical formulation. • One-dimensional systems. • Motion under central forces. • N-points systems. • Constrained systems. • Lagrange equations. • Hamiltonian systems. • Canonical transformations. • Small oscillations of Lagrangian systems. • Variational principles. • More about hamiltonian systems. <p>On successful completion of this module, the student should :</p> <ul style="list-style-type: none"> • have acquired the basic notions of Classical and Analytical Mechanics, • be able to handle the related mathematical tools, • have acquired the ability of reading and understanding more advanced topics in Mechanics, • be able to face subsequent topics in Physics as Quantum and Statistical Mechanics, • be able to recognize when the acquired notions are useful for the comprehension of other topics, • be able to face novel problems with a similar mathematical modeling.
3	Course prerequisites	Differential Equations, Elementary Linear Algebra.
4	Teaching methods and language	<p>Lectures and exercises.</p> <p>Language: Italian</p> <p>Reference textbooks</p> <ul style="list-style-type: none"> • A. Celletti, <i>Esercizi e complementi di Meccanica Razionale</i>. Aracne. 2003. • R. Esposito, <i>Appunti dalle lezioni di Meccanica Razionale</i>. Aracne. 1998. http://univaq.it/~serva/teaching/teaching.html • A. Teta, <i>Appunti di Meccanica Razionale</i>. http://univaq.it/~serva/teaching/teaching.html • E. Olivieri, <i>Appunti di Meccanica Razionale</i>. UniTor. 1990. • V. I. Arnold, <i>Mathematical Methods of Classical Mechanics</i>. Springer-Verlag. 1989. • L. Benfatto, R. Raimondi, E. Scoppola, <i>Meccanica Hamiltoniana</i>. 2006-2007. http://univaq.it/~serva/teaching/teaching.html
5	Assessment methods	Written and, if necessary, oral examination.