



Programme of Module "Modelli Matematici"

<ul style="list-style-type: none"> <li>• Code: DT0149</li> <li>• Type of course unit: Compulsory (Bachelor Degree in Mathematics curriculum Generale)</li> <li>• Level of course unit: Undergraduate Degrees</li> <li>• Semester: 1</li> </ul>		
Number of ects credits: (Bachelor Degree in Mathematics) 3 (workload 75 hours)		
Teachers: Maurizio Serva (serva@univaq.it)		
<b>1</b>	<b>Course objectives</b>	This course aims to enable the students to understand basic Quantum Mechanics and to handle the Schrödinger Equation.
<b>2</b>	<b>Course content and learning outcomes (dublin descriptors)</b>	<p>Topics of the module include:</p> <ul style="list-style-type: none"> <li>• The behavior of quantum systems and a little of hystory.</li> <li>• Postulates, principles and mathematical tools of Quantum Mechanics.</li> <li>• Position and momentum: the Heisenberg's uncertainty principle.</li> <li>• The dynamics: the Shrödinger equation.</li> <li>• The Shrödinger equation in one dimension.</li> <li>• The Shrödinger equation for the harmonic oscillator.</li> </ul> <p>On successful completion of this module, the student should :</p> <ul style="list-style-type: none"> <li>• • have acquired the basic notions of Quantum Mechanics, • be able to handle the Shrödinger Equation in simple cases, • be able of reading and understanding more advanced topics in Quantum Mechanics, • have acquired a deeper comprehension of the physical world, • be able to face novel problems with a similar mathematical modeling.</li> </ul>
<b>3</b>	<b>Course prerequisites</b>	Classical Mechanics, Elementary Probability Theory, Linear Algebra.
<b>4</b>	<b>Teaching methods and language</b>	<p>Lectures and exercises.</p> <p><b>Language:</b> Italian</p> <p><b>Reference textbooks</b></p> <ul style="list-style-type: none"> <li>• Lev D. Landau e Evgenij M. Lifšits, , <i>Fisica Teorica 3 - Meccanica quantistica Teoria non relativistica</i>. Editori Riuniti, University Press. 2010.</li> <li>• P. A. M. Dirac, <i>I princ??pi della Meccanica Quantistica</i>. Bollati Boringhieri. 1990.</li> <li>• K. Konishi e G. Paffuti, <i>Meccanica Quantistica: nuova introduzione</i>. Pisa University Press. 2005. <a href="http://people.disim.univaq.it/?serva/teaching/teaching.html">http://people.disim.univaq.it/?serva/teaching/teaching.html</a></li> </ul>
<b>5</b>	<b>Assessment methods</b>	Written and, if necessary, oral examination.