PhD Program in Chemical Sciences

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The International Doctorate program in Chemical Sciences aims at post-university education in the field of Chemical research. To this end, the course includes three different Curricula, as follows:

Curriculum 1: Spectroscopy, Chemical Kinetics and Molecular Dynamics.
This curriculum focuses on the molecular dynamics of elementary processes in the gas-phase, ranging from the study of advanced molecular beam techniques and theoretical methods of reaction dynamics and intermolecular interactions, to studies on the dynamical properties of liquid systems including aqueous solutions of biomolecules, photophysics, photochemistry, spectroscopy, nonlinear dynamics and chaos.

Curriculum 2: Methods and materials for catalysis, energy, environment and cultural heritage.
This curriculum focuses on advanced synthesis in inorganic and organic chemistry, green chemistry, synthetic eco-sustainable methodologies, homogeneous catalysis, modeling of materials for solar cells, environmental chemistry and modeling, advanced materials and diagnostic techniques for the conservation of cultural heritage, inorganic-organic hybrid materials and polymeric nanocomposites for application in catalysis and energy conversion/storage.

Curriculum 3: Theoretical Chemistry and Computational Modeling.
This curriculum focuses on theoretical chemistry, computational methodologies and molecular modeling, ranging from the study, by accurate ab-initio methods, of the nature of chemical bonds, non-covalent interactions and reaction mechanisms in coordination chemistry, to computational spectroscopy, to lipidomics, metabolomics, quantitative structure-property prediction, pharmaco-kinetic properties, and toxicity prediction.

During the three years of the Doctorate, each of the three Curricula is to ensure a progression of both experimental and theoretical learning, which is to include a total of 30 CFU (180 hours) for courses (including foreign languages, informatics, management of research, valorization of research and intellectual property), seminars and research periods abroad.