

Computational mechanics and heritage structures

This course aims to educate students in the structural systems of monumental structures, their peculiarities, and their analysis through numerical methods of analysis such as the finite element method.

The analysis of a historical structure with masonry load-bearing vertical elements differs from that of modern structures because of the materials, the characteristics of the structural system and the distribution of inertial forces of horizontal load resistance elements in the vertical sense. Masonry structures exhibit a great variety following the development of structural engineering over a number of centuries. Their structural systems have a wide range of complexity and are therefore a field of research, in which numerical simulation methods are applied as finite elements, which with proper mathematical formulation can take into account the complexity of such mechanical problem.

The objective of this course is to acquire basic knowledge in the application of computational engineering to the analysis of monumental structures. Examples of analysis of monumental, historical and traditional constructions as well as studies of the various methods of intervention and their applicability are presented along with additional insights in the development of specialized structural rehabilitation studies and information on the evolution of research in the relevant fields.