

**Scuola di Dottorato del Politecnico di Bari**

**Ph.D. School**

**Advanced numerical modelling and nonlinear analysis of existing buildings under seismic actions**

**CFU 3 (24 ore)**

**SSD: ICAR/09**

**Program.**

1. Introduction to advanced computational and numerical methods for the nonlinear structural analysis.

The basics elements and references for the Fem analysis will be provided, and additionally an overview about alternative computational approaches will be given: Finite Element Methods, Distinct Element Methods, Rigid Body and Spring Methods. The course will be then specifically focused about the modelling and analysis in the nonlinear dynamic field, time-history analysis; issues and approaches in the selection of the seismic input; use of nonlinear static approaches, with specific regard to multi-modal and adaptive pushover analysis.

1. Methods and strategies for the structural and seismic analysis of existing buildings accounting for structural and nonstructural elements

The modelling and analysis peculiarities of existing buildings will be provided, with a focus on the influence of nonstructural elements on the structural response and on the possible strategies and computational approaches to be used.

1. Presentation of real case studies with the use of specialized software.

The course will provide a short exercise developed by the PhD student on a theme chosen according to his/her specific interests of research

Motivation. This the course represents a fundamental basis for all doctoral students dealing with complex engineering problems, in the spirit of the program of the Ph.D. in Risk and Environmental, Territorial And Building Development, but involves also a number of interdisciplinary themes interesting in other engineering fields, such as, for example: development, design and testing of mechanical devices for passive and active seismic protection; processing of signals to be used as an input; treatment of large dataset data deriving from numerical vulnerability analyses.