PdD Program in Civil Engineering held by Roma Tre University, Dipartimento di Ingegneria Civile Informatica e delle Teconlogie Aeronautiche

PhD Program of National Interest in Defense against natural risks and ecological transition of the built environment held by the University of Catania, Dipartimento di Ingegneria Civile-Industriale e Architettura

PhD COURSE

ROME, 30 JUNE – 3 JULY 2026

THEORY AND PRACTICE OF STRUCTURAL ANALYSIS OF CULTURAL HERITAGE

Gianmarco de Felice

with the participation of :

Prof. Daniela Addessi, Prof. Maurizio Angelillo, Eng. Alessandro Bozzetti, Prof. Antonello de Luca, Prof. Barbara Ferracuti, Prof. Domenico Liberatore, Eng. Massimo Mariani, Prof. Roberto Realfonzo.

The course addresses the main issues in research and professional practice relating to structural analysis and seismic risk mitigation in historic buildings.

Lectures will be held in person at the **Department of Engineering, Roma Tre University, Via Vito Volterra 62, Rome – Civil Engineering Seminar Room, from Tuesday 30 June to Friday 3 July 2026, from 9.30 am to 5.30 pm.**

The course comprises two morning sessions and one afternoon session, featuring two guest experts in the field and an open discussion on the topic in question.

Below is the list of sessions.

The course will be taught in English, but some of the afternoon discussions will be in Italian

1. Seismic behaviour of historic masonry structures: observation, experimentatal testing, modelling and retrofitting

30 June 2026, 9.30 am – 5.30 pm

The assessment of the seismic safety of historic buildings has evolved over the last twenty years, shifting from the response of walls to in-plane loads to local collapse mechanisms and disaggregation phenomena. The course begins with a review of seismic damage to historic masonry structures during seismic events over the last thirty years and of laboratory experiments, to illustrate the structural analysis methods used to predict the seismic behaviour of historic buildings, as well as intervention techniques for risk mitigation. This will be followed by an open discussion with Prof. Domenico Liberatore and Eng. Massimo Mariani.

2. Structural modelling of historic buildings

1 July 2026, 09:30 – 17:30

The modelling of historic buildings for vertical loads and, above all, for seismic actions remains one of the unresolved issues in both research and professional practice. Whilst computational models are becoming increasingly sophisticated and refined, their application in assessing the safety of historic buildings remains highly problematic. The difficulty in calibrating the constitutive parameters, the computational burden and the complexities of historic buildings make them ill-suited to accurate non-linear modelling, to the extent that calculation methods based on the Heyman approach continue to be used. The course reviews the main approaches to assessing the safety of masonry structures and their application in research and within the current regulatory framework, and outlines modelling perspectives, illustrating some of the models developed for the structural analysis of masonry and their potential applications. This will be followed by an open discussion with Professors Daniela Addessi and Maurizio Angelillo.

3. Structural design in historic buildings: challenges and examples within the regulatory framework

2 July 2026, 9.30 am – 5.30 pm

Structural intervention design requires the challenging skill of balancing the achievement of an adequate level of safety with the principle of minimal intervention, aimed at preserving the construction characteristics and structural logic of the historic building. The course presents a number of emblematic projects and examples of structural interventions on historic buildings, discussing the appropriateness of using traditional techniques or employing new technologies, with reference to issues of calculation, monitoring and site management, within the Italian regulatory framework. This will be followed by an open discussion with Prof. Antonello de Luca and Eng. Alessandro Bozzetti.

4. Reinforcement of existing structures using FRCM systems: technology, testing and design.

3 July 2026, 9.30 am – 5.30 pm

The term *FRCM – Fabric Reinforced Cementitious Matrix* encompasses a wide range of structural reinforcement systems and technologies developed over the last twenty years and now commonly used for structural reinforcement. The seminar reviews the various systems, illustrating their mechanical properties, durability characteristics, methods of application, experimental qualification, acceptance tests, calculation and design methods within the international regulatory framework. This will be followed by an open discussion with Professors Barbara Ferracuti and Roberto Realfonzo.