



5-DAY WORKSHOP ON:



IUSS
Scuola Universitaria Superiore Pavia



DJURA
RISK-DATA-ENGINEERING



PERFORMANCE-BASED EARTHQUAKE ENGINEERING

29 SEPTEMBER - 3 OCTOBER 2025

FACULTY OF CIVIL ENGINEERING UNIVERSITY OF ZAGREB

AIM OF THE COURSE:

This workshop covers topics related to performance-based earthquake engineering (PBEE) of existing buildings. A quick background on the development of PBEE is first provided, followed by the notable developments in the past 25 years that have led to the current and avant-garde approaches available in the literature. This relates to the seismic risk assessment and classification of buildings, particularly those commonly found in Southern Europe. The workshop focuses on the ingredients necessary for quantifying risk and estimating economic losses, presenting both simplified and extensive risk assessment methods available to practitioners. Through practical examples in the open-source software package OpenSees and the Python programming language, participants will have the opportunity to develop their own models, perform analyses, and interpret results according to the latest PBEE approaches, thereby gaining knowledge and skills applicable in both research and engineering practice. It aims to provide engineers who are already familiar with current building codes and other standard seismic analysis methods with a better understanding of these advanced topics and state-of-the-art methods available within modern PBEE.

DATES: 29/09/2025 – 03/10/2025

HOURS: 30 hours (15 lectures + 15 tutorials)

VENUE: Faculty of Civil Engineering, University of Zagreb

INFO & CONTACTS:

maja.banicek@grad.unizg.hr

REGISTRATION FEE: FREE!!!

INSTRUCTORS:



Prof Gerard J. O'Reilly
IUSS Pavia, Italy

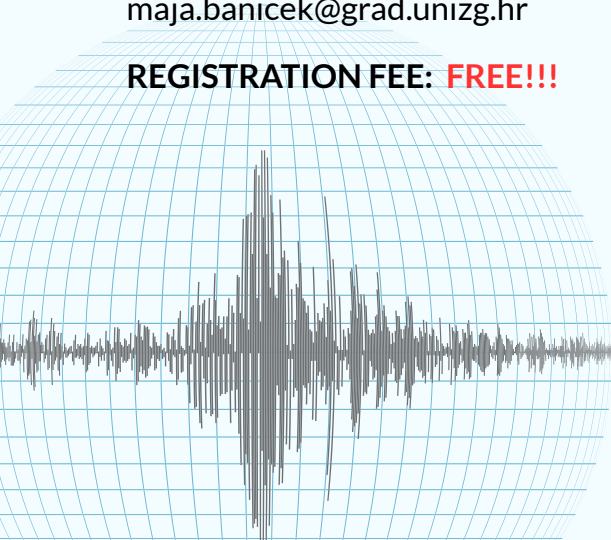


Davit Shahnazaryan, PhD
IUSS Pavia, Italy



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REGISTRATION:





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SCHEDULE

Date	Time	Topic
Mon 29/09	09:00 – 12:00	1. Introduction 2. Typology specific issues <ul style="list-style-type: none">• Non-ductile RC frames• Unreinforced masonry 3. Analysis Methods - Part I <ul style="list-style-type: none">• Non-linear static analysis• Non-linear dynamic analysis• MDOF vs SDOF models• Incremental dynamic analysis (IDA)
	14:00 – 17:00	Tutorial: Part 1 - Introduction to case study building Part 2 - Perform a modal and pushover analysis Part 3 - Perform an IDA
Tue 30/09	09:00 – 12:00	4. Ground Motion Record Selection <ul style="list-style-type: none">• Code-based record selection• Conditional spectrum 5. Analysis Methods - Part II <ul style="list-style-type: none">• Cloud analysis (CA)• Multiple stripe analysis (MSA)
	14:00 – 17:00	Tutorial: Part 4 - Select ground motion records for MSA Part 5 - Perform an MSA
Wed 01/10	09:00 – 12:00	6. Seismic Risk <ul style="list-style-type: none">• Seismic hazard, logic trees and disaggregation• Fragility functions (FFs)• Calculation of risk
	14:00 – 17:00	Tutorial: Part 6 - Develop building-specific fragility functions Part 7 - Compute collapse risk
Thur 02/10	09:00 – 12:00	7. Loss Assessment <ul style="list-style-type: none">• Non-structural elements• Building damageable inventories• Building-specific loss estimation• Storey loss functions
	14:00 – 17:00	Tutorial: Part 8 - Create storey loss functions
Fri 03/10	09:00 – 12:00	8. Simplified risk assessment and classification <ul style="list-style-type: none">• Pushover-based loss and risk methods• Seismic risk classification guidelines
	14:00 – 17:00	Tutorial: Part 9 - Estimate economic losses Part 10 - Perform seismic risk classification

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