ROSE School | Earthquake Engineering

GEM Models, OpenQuake Engine and Tools Training

Lecturers: **H. Crowley, M. Pagani & V. Silva**
Date: 1/02/2027 – 12/02/2027
Credits: 3 ECTS (CFU)

Course Description

This course is organised by the Global Earthquake Model (GEM) Foundation, and aims to provide a comprehensive overview of state-of-the-art methods and models for seismic hazard, exposure, vulnerability and risk assessment, and their implementation within the OpenQuake Engine under a number of different use cases. The course will include both theoretical lectures and training sessions on how to use the OpenQuake Engine, from basic scenario analysis to advanced modelling of probabilistic seismic hazard and risk.

Topics

- Exposure modelling at urban, regional and national scale.
- GEM Building Taxonomy and Global Exposure Model.
- GEM's Vulnerability modelling framework and tools.
- OpenQuake Engine: scenario hazard, damage and risk calculators.
- OpenQuake Engine: event-based seismic hazard and risk calculators.
- GEM's Global Seismic Hazard and Risk Models.
- Advanced risk analysis with the OpenQuake Engine.

Learning Outcomes

Following this course students will understand the methods, standards and tools used in the development of GEM's global seismic hazard and risk models. Following the hands-on training that will take place during the course, students will be able to configure and run the OpenQuake Engine for scenario and probabilistic analyses and create reproducible outputs (maps/tables) and explain the input models, assumptions, and limitations. Interested students can also opt to take the exam to become a certified OpenQuake Engine User for Scenario Assessment.