SSM
Scuola Superiore Meridionale

Course title:

Quantitative Risk Analysis

Duration [number of hours]**: 24**

PhD Program [MERC/MPS/SPACE]**: MERC**

Name and Contact details of unit organizer(s):

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Course Description [max 150 words]**:**

The objective of the course is to provide the students with the fundamentals of quantitative risk analysis of systems exposed to natural and man-made hazards. Starting from seismic risk analysis, other risks will be discussed, such as those related to wind and fire. After recalling the basics of probability theory, the framework for quantifying losses will be introduced. Then, hazard, vulnerability and exposure assessment will be discussed. Lectures will be focused on both theory and applications. Students will be required to work on assignments dealing with risk analysis problems, the solution to which will be discussed during classes. Also, students will be required to work with Matlab (or Excel, depending on their preference). The course consists of twelve lessons of two hours each. On successful completion of the course, students are expected to acquire the basic knowledge in risk analysis, which can be used in their research field, if needed.

Syllabus [itemized list of course topics]**:**

- Basics of probability theory
- Quantification of expected losses
- Hazard assessment
- Vulnerability assessment and consequences

Assessment [form of assessment, e.g., final written/oral exam, solutions of problems during the course, final project to be handed-in, etc.]**:**

Students will engage in a series of homework consisting on problems designed to apply the concepts given during class sessions. At the end of the course, each student will be given with a vote, which will be determined based on the problem solutions developed in each homework and written final examination.

Suggested reading and online resources:

Benjamin, J. R., & Cornell, C. A. (2014). Probability, statistics, and decision for civil engineers. Courier Corporation.
Iervolino, I. (2021). Dinamica delle strutture e ingegneria sismica: Principi e applicazioni. HOEPLI EDITORE (In Italian).
Additional references will be given during the lectures.