UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Applied Geophysics

2627-2-F7402Q016

Aims

Give the students the theoretical knowledge about Applied Geophysics, fundamental for acquiring and analysing geophysical data for near-surface and shallow-crust investigation, often related to natural and athropic hazards. Give the students the full field experience with different geophysical equipments: from planning and executing a near-surface geophysical investigation, to the data analysis and critical interpretation of the data derived from such investigation, to the communication of the results of the investigation through a shared project and the final report.

Contents

The course will furnish the basics concepts and practical skills of the main methods for the exploration of the subsurface, and of the geophysical data analysis, with a focus on geological and environmental topics and natural and anthropic hazards,using syncronous lectures, coding laboratories for data analysis and field experience.

For each geophysical method, the physical principles, the working hypothesis and the technique for data analysis and interpretation will be presented, together with a criticla review of the weaknesses of the method.

Examples of: planning of geophysical fieldwork, data analysis on shared paltforms and presentation of the reuslts will be furnished. The course includes two pratical fieldworks for the acqusition of the relevant data.

Detailed program

The course is organized along two main, complementary lines: geophysical data and methods for data analysis.

The course will present, both theoretically and practically, five different geophysical dat: (Distributed Acosutic

Sensing, electrical resistivity, georadar, induced seismicity data, horizontal-to-Vertical spectral ratio). For each kind of data, the course will present and analyse different datasets acquired for near- and shallow- surface investigations (for both subsurface exploration and monitoring targets).

At the same time, the tools for geophysical data analysis will be introduced, both for the theoretical concepts and the practical applications using a shared platform (Hupyter Notebooks, https://jupyter.org/): geophysical dataset/database preparation, direct modelling, inverse modelling and joint inversion.

Prerequisites

The course of "Prospezioni Geofisiche" is not mandatory but strongly suggested.

Teaching form

The course is organized as follow:

a) 1 one-hour lectures, in person, Delivered Didactics, for presenting the course contents

b) 3 two-hour lectures, in person, Delivered Didactics, for theoretical contents

c) 2 six-hour field activities, in person, Interactive Teaching

d) 12 two-hours lab activities, in person, Interactive Teaching

Textbook and teaching resource

Semester

Second

Assessment method

**Written report **

A short report (max 4 pages) presenting the field acquisition and data analysis of one of the activities done during the applied geophysics course.

**Prova orale **

Discussion of the written report
Discussion about the basic principles related to the geophysical techniques presented during the courses.

Office hours

On demand. Contact the lecturer at: nicola.pianaagostinetti@unimib.it

Sustainable Development Goals

AFFORDABLE AND CLEAN ENERGY | CLIMATE ACTION