

## SYLLABUS DEL CORSO

### Idrogeologia Ambientale (blended)

2122-1-F7501Q092

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#### Aims

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- the ability to study and quantitatively analyze the main natural hydrogeological aspects and the anthropic impact on them;
- the ability to express complex scientific concepts in an elaborate form, both orally and in written form, with properties of language and conceptual relevance;
- the ability to develop an autonomy of analysis and elaboration of complex hydrogeological situations, for the purpose of an integrated management.

- Describe quantitatively the geometric and hydrogeological structure of a complex environmental context
- Calculate the main hydrogeological parameters and understand their influence on the environmental context
- Calculate the flow velocity of a water table

- Analyze an environmental hydrogeological problem
  - Identify the most suitable tools for this analysis
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- Apply the acquired knowledge to contexts that are also different from those studied during the course
- Understanding scientific articles related to the hydrogeological characterization of an environmental system

## Contents

The target of the course is the study of groundwater resources, also in relation with the surface water, with a view to their sustainable management. \_\_\_\_\_

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## Detailed program

**The course is divided into weekly modules, according to a blended learning course**, using lessons in classroom and e-learning activities, implemented on the Moodle platform of the University. In particular, the course will be structured in 8 modules, weekly, divided by subject:

- Confined and unconfined aquifer: structural and hydraulic elements to characterize them
- Hydrogeological balance elements: balance elements in and out in plain or mountain areas
- The hydrogeological sections to reconstruct the underground structure: reconstruction of manual hydrogeological sections,
- Groundwater laws: Darcy, Dupuit and Bernulli laws,
- Hydrogeological parameters,: hydraulic conductivity, transmissivity, real and apparent velocity, storage coefficient,
- Aquifer network flow: isopiezometric lines and flow lines, 3D view
- Hydrogeological instruments: drilling and hydrogeological instrumentation: wells and piezometers, development and completion
- The catchment of the groundwater: wells pumping cones, interference between wells, protection and respect area.

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## Prerequisites

Knowledge of fluid dynamics and of hydrological balance.

## Teaching form

The teaching is done in blended-e-learning mode and is divided into the following teaching methods:

- lezzons. 4 cfu (32 ore)
- elearning laboratory, 2 cfu (16 ore)

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1. a lecture, to clarify the theoretical aspects more complex, to be carried out in the classroom with meetings of four hours weekly fixed (for a total of 32 hours);
  2. slide screened and discussed by the teacher in the classroom;
  3. guided exercises carried out by the teacher and students can follow them at their own pace and ways;
  4. development of specific quiz for each topic to help students in self-assessment, to prepare themselves for the exam;
  5. a specific forum on the subject that encourages constant dialogue between students, teachers and tutors. The teacher will moderate all asynchronous forums designed to explore the themes of the course, with the help of material provided.

## Textbook and teaching resource

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- video material
  - extra material for self-study in blended elearning hours
  - exercises carried out and to be performed independently

- training quizzes independently

## Semester

First semester

## Assessment method

The competences provided during the frontal lessons are evaluated with

- a written exam at the end of the course
- an optional oral exam at the request of the student.

- an exercise that brings together the skills acquired during the course (for a maximum total of 10/30), to verify the ability to connect the various parts of the program to face real hydrogeological problems (weighs 50% of the text). The writing is valid at most 20/30.

At the request of the student it is possible to take an oral exam if the minimum mark of 10/30 is reached in the written exam and 7/10 in the blended elearning part.

## Office hours

By appointment via email

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