UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

# Groundwater Modelling

**2627-2-F7402Q013**

## Aims

To provide theoretical and practical basis on numerical techniques for groundwater modelling. The student will be able to use different numerical codes to solve problems related to fluid flow in geological problems.

## Contents

Basics of numerical methods with particular reference to groundwater modelling.
Application of finite element and finite difference numerical codes for the solution of groundwater flow.

## Detailed program

Basics of numerical methods with particular reference to groundwater modelling. Analysis of different approaches: finite differences, finite elements. Approximations, Taylor series, conditioning, stability, consistency, boundary conditions, iterative methods.
Basics of hydrogeological concepts useful for the definition and the solution of problems by using numerical methods. Examples of numerical solutions, eq. diffusion, advection, dispersion, heat flow.
Application of finite element (e.g., FEFLOW) and finite difference (e.g., MODFLOW with GMS and GV interfaces) numerical codes for the solution of:
- groundwater flow in saturated and unsaturated conditions, steady and transient.
- contaminant transport
- coastal saline aquifers
- well design
- shallow geothermics

## Prerequisites

Hydrogeology

## Teaching form

The course is taught in English and divided into:
24 two-hour lab activities, in person, Interactive Teaching (4 ECTS, 48 hours)

## Textbook and teaching resource

Course notes and power-point slides provided by the teacher. Scientific papers.

## Semester

Fall semester

## Assessment method

Development of a practical modelling project with report and short discussion.

## Office hours

From Monday to Friday, 2 p.m. - 4 p.m.

## Sustainable Development Goals

CLEAN WATER AND SANITATION | CLIMATE ACTION