



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Laboratorio Modellazione Idrogeologica

2122-2-F7401Q077

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#### 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

## **Prerequisites**

Hydrogeology

## **Teaching form**

Lessons and laboratory activity with the practical use of numerical modelling software (e.g., FEFLOW).

## **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.

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