

UNIVERSITÀ DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Groundwater Modelling

2122-2-F7401Q077

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.

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.

- contaminant transport

- coastal saline aquifers

- well design